

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 January 2003 (30.01.2003)

PCT

(10) International Publication Number
WO 03/008583 A2

(51) International Patent Classification⁷: **C12N 15/12**,
C07K 14/47, C12N 5/10, G01N 33/50, 33/53, C12Q 1/68

W. [US/US]; 1802 Valdora Street, Davis, CA 95616 (US).
ENGELHARD, Eric, K. [US/US]; 704 Hudson Street,
Davis, CA 95616 (US).

(21) International Application Number: PCT/US01/51291

(74) Agents: **BASU, Shantanu** et al.; Morrison & Foerster,
LLP, 755 Page Mill Road, Palo Alto, CA 94304-1018 (US).

(22) International Filing Date:
26 December 2001 (26.12.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/798,586 2 March 2001 (02.03.2001) US
10/004,113 23 October 2001 (23.10.2001) US
10/052,482 8 November 2001 (08.11.2001) US
09/997,722 30 November 2001 (30.11.2001) US
10/034,650 20 December 2001 (20.12.2001) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier application:
US Not furnished (CIP)
Filed on Not furnished

Published:

— without international search report and to be republished
upon receipt of that report

(71) Applicant (*for all designated States except US*): **SAGRES
DISCOVERY** [US/US]; Suite 400, 2795 Second Street,
Davis, CA 95616 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **MORRIS, David**,

*For two-letter codes and other abbreviations, refer to the "Guidance
Notes on Codes and Abbreviations" appearing at the beginning
of each regular issue of the PCT Gazette.*



WO 03/008583 A2

(54) Title: NOVEL COMPOSITIONS AND METHODS FOR CANCER

(57) Abstract: The present invention relates to novel sequences for use in diagnosis and treatment of carcinomas, especially lymphoma carcinomas. In addition, the present invention describes the use of novel compositions for use in screening methods.

5

NOVEL COMPOSITIONS AND METHODS FOR CANCER

10

The present application is a continuing application of U.S.S.N.s 09/747,377, filed December 22, 2000 and 09/798,586, filed March 2, 2001, and applications entitled Novel Compositions and Methods for Cancer filed October 23, 2001, November 8, 2001, November 30, 2001, and December 20, 2001, all of which are expressly incorporated herein by reference.

15

FIELD OF THE INVENTION

20

The present invention relates to novel sequences for use in diagnosis and treatment of cancer, especially carcinomas, as well as the use of the novel compositions in screening methods.

BACKGROUND OF THE INVENTION

25

Oncogenes are genes that can cause cancer. Carcinogenesis can occur by a wide variety of mechanisms, including infection of cells by viruses containing oncogenes, activation of protooncogenes in the host genome, and mutations of protooncogenes and tumor suppressor genes.

30

There are a number of viruses known to be involved in human cancer as well as in animal cancer. Of particular interest here are viruses that do not contain oncogenes themselves; these are slow-transforming retroviruses. They induce tumors by integrating into the host genome and affecting neighboring protooncogenes in a variety of ways, including promoter insertion, enhancer insertion, and/or truncation of a protooncogene or tumor suppressor gene. The analysis of sequences at or near the insertion sites led to the identification of a number of new protooncogenes.

35

40

With respect to lymphoma and leukemia, murine leukemia retrovirus (MuLV), such as SL3-3 or Akv, is a potent inducer of tumors when inoculated into susceptible newborn mice, or when carried in the germline. A number of sequences have been identified as relevant in the induction of lymphoma and leukemia by analyzing the insertion sites; see Sorensen et al., J. of Virology 74:2161 (2000); Hansen et al., Genome Res. 10(2):237-43 (2000); Sorensen et al., J. Virology 70:4063 (1996); Sorensen et al., J. Virology 67:7118 (1993); Joosten et al.,

Virology 268:308 (2000); and Li et al., Nature Genetics 23:348 (1999); all of which are expressly incorporated by reference herein.

5 Lymphomas are a collection of cancers involving the lymphatic system and are generally categorized as Hodgkin's disease and Non-Hodgkin lymphoma. Hodgkin's lymphomas are of B lymphocyte origin. Non-Hodgkin lymphomas are a collection of over 30 different types of cancers including T and B lymphomas. Leukemia is a disease of the blood forming tissues and includes B and T cell lymphocytic leukemias. It is characterized by an abnormal and persistent increase in the number of leukocytes and the amount of bone marrow, with
10 enlargement of the spleen and lymph nodes.

Breast cancer is one of the most significant diseases that affects women. At the current rate, American women have a 1 in 8 risk of developing breast cancer by age 95 (American Cancer Society, 1992). Treatment of breast cancer at later stages is often futile and disfiguring,
15 making early detection a high priority in medical management of the disease.

Accordingly, it is an object of the invention to provide sequences involved in cancer and in particular in oncogenesis.

20

SUMMARY OF THE INVENTION

In accordance with the objects outlined above, the present invention provides methods for screening for compositions which modulate carcinomas, especially lymphoma and leukemia.
25 Also provided herein are methods of inhibiting proliferation of a cell, preferably a lymphoma cell. Methods of treatment of carcinomas, including diagnosis, are also provided herein.

In one aspect, a method of screening drug candidates comprises providing a cell that expresses a carcinoma associated (CA) gene or fragments thereof. Preferred embodiments
30 of CA genes are genes which are differentially expressed in cancer cells, preferably lymphatic, breast, prostate or epithelial cells, compared to other cells. Preferred embodiments of CA genes used in the methods herein include, but are not limited to the nucleic acids selected from Tables 1-112. The method further includes adding a drug candidate to the cell and determining the effect of the drug candidate on the expression of the
35 CA gene.

In one embodiment, the method of screening drug candidates includes comparing the level of expression in the absence of the drug candidate to the level of expression in the presence of the drug candidate.

Also provided herein is a method of screening for a bioactive agent capable of binding to a CA protein (CAP), the method comprising combining the CAP and a candidate bioactive agent, and determining the binding of the candidate agent to the CAP.

5

Further provided herein is a method for screening for a bioactive agent capable of modulating the activity of a CAP. In one embodiment, the method comprises combining the CAP and a candidate bioactive agent, and determining the effect of the candidate agent on the bioactivity of the CAP.

10

Also provided is a method of evaluating the effect of a candidate carcinoma drug comprising administering the drug to a patient and removing a cell sample from the patient. The expression profile of the cell is then determined. This method may further comprise comparing the expression profile of the patient to an expression profile of a healthy individual.

15

In a further aspect, a method for inhibiting the activity of an CA protein is provided. In one embodiment, the method comprises administering to a patient an inhibitor of a CA protein preferably selected from the group consisting of the sequences outlined in Tables 1-112 or their complements.

20

A method of neutralizing the effect of a CA protein, preferably a protein encoded by a nucleic acid selected from the group of sequences outlined in Tables 1-112, is also provided. Preferably, the method comprises contacting an agent specific for said protein with said protein in an amount sufficient to effect neutralization.

25

Moreover, provided herein is a biochip comprising a nucleic acid segment which encodes a CA protein, preferably selected from the sequences outlined in Tables 1-112.

Also provided herein is a method for diagnosing or determining the propensity to carcinomas, especially lymphoma or leukemia by sequencing at least one carcinoma or lymphoma gene of an individual. In yet another aspect of the invention, a method is provided for determining carcinoma including lymphoma and leukemia gene copy number in an individual.

30

Novel sequences are also provided herein. Other aspects of the invention will become apparent to the skilled artisan by the following description of the invention.

35

DETAILED DESCRIPTION OF THE INVENTION

The present invention is directed to a number of sequences associated with carcinomas,

especially lymphoma, breast cancer or prostate cancer. The relatively tight linkage between clonally-integrated proviruses and protooncogenes forms "provirus tagging", in which slow-transforming retroviruses that act by an insertion mutation mechanism are used to isolate protooncogenes. In some models, uninfected animals have low cancer rates, and infected
5 animals have high cancer rates. It is known that many of the retroviruses involved do not carry transduced host protooncogenes or pathogenic *trans*-acting viral genes, and thus the cancer incidence must therefor be a direct consequence of proviral integration effects into host protooncogenes. Since proviral integration is random, rare integrants will "activate" host
10 protooncogenes that provide a selective growth advantage, and these rare events result in new proviruses at clonal stoichiometries in tumors.

The use of oncogenic retroviruses, whose sequences insert into the genome of the host organism resulting in carcinoma, allows the identification of host sequences involved in carcinoma. These sequences may then be used in a number of different ways, including
15 diagnosis, prognosis, screening for modulators (including both agonists and antagonists), antibody generation (for immunotherapy and imaging), etc. However, as will be appreciated by those in the art, oncogenes that are identified in one type of cancer such as lymphoma or leukemia have a strong likelihood of being involved in other types of cancers as well. Thus, while the sequences outlined herein are initially identified as correlated with lymphoma, they
20 can also be found in other types of cancers as well, outlined below.

Accordingly, the present invention provides nucleic acid and protein sequences that are associated with carcinoma, herein termed "carcinoma associated" or "CA" sequences. In a preferred embodiment, the present invention provides nucleic acid and protein sequences
25 that are associated with carcinomas which originate in lymphatic tissue, herein termed "lymphoma associated", "leukemia associated" or "LA" sequences.

Suitable cancers which can be diagnosed or screened for using the methods of the present invention include cancers classified by site or by histological type. Cancers classified by site
30 include cancer of the oral cavity and pharynx (lip, tongue, salivary gland, floor of mouth, gum and other mouth, nasopharynx, tonsil, oropharynx, hypopharynx, other oral/pharynx); cancers of the digestive system (esophagus; stomach; small intestine; colon and rectum; anus, anal canal, and anorectum; liver; intrahepatic bile duct; gallbladder; other biliary; pancreas; retroperitoneum; peritoneum, omentum, and mesentery; other digestive); cancers of the
35 respiratory system (nasal cavity, middle ear, and sinuses; larynx; lung and bronchus; pleura; trachea, mediastinum, and other respiratory); cancers of the mesothelioma; bones and joints; and soft tissue, including heart; skin cancers, including melanomas and other non-epithelial skin cancers; Kaposi's sarcoma and breast cancer; cancer of the female genital system (cervix uteri; corpus uteri; uterus, nos; ovary; vagina; vulva; and other female genital); cancers

of the male genital system (prostate gland; testis; penis; and other male genital); cancers of the urinary system (urinary bladder; kidney and renal pelvis; ureter; and other urinary); cancers of the eye and orbit; cancers of the brain and nervous system (brain; and other nervous system); cancers of the endocrine system (thyroid gland and other endocrine, including thymus); cancers of the lymphomas (hodgkin's disease and non-hodgkin's lymphoma), multiple myeloma, and leukemias (lymphocytic leukemia; myeloid leukemia; monocytic leukemia; and other leukemias).

Other cancers, classified by histological type, that may be associated with the sequences of the invention include, but are not limited to, Neoplasm, malignant; Carcinoma, NOS; Carcinoma, undifferentiated, NOS; Giant and spindle cell carcinoma; Small cell carcinoma, NOS; Papillary carcinoma, NOS; Squamous cell carcinoma, NOS; Lymphoepithelial carcinoma; Basal cell carcinoma, NOS; Pilomatrix carcinoma; Transitional cell carcinoma, NOS; Papillary transitional cell carcinoma; Adenocarcinoma, NOS; Gastrinoma, malignant; Cholangiocarcinoma; Hepatocellular carcinoma, NOS; Combined hepatocellular carcinoma and cholangiocarcinoma; Trabecular adenocarcinoma; Adenoid cystic carcinoma; Adenocarcinoma in adenomatous polyp; Adenocarcinoma, familial polyposis coli; Solid carcinoma, NOS; Carcinoid tumor, malignant; Branchiolo-alveolar adenocarcinoma; Papillary adenocarcinoma, NOS; Chromophobe carcinoma; Acidophil carcinoma; Oxyphilic adenocarcinoma; Basophil carcinoma; Clear cell adenocarcinoma, NOS; Granular cell carcinoma; Follicular adenocarcinoma, NOS; Papillary and follicular adenocarcinoma; Nonencapsulating sclerosing carcinoma; Adrenal cortical carcinoma; Endometroid carcinoma; Skin appendage carcinoma; Apocrine adenocarcinoma; Sebaceous adenocarcinoma; Ceruminous adenocarcinoma; Mucoepidermoid carcinoma; Cystadenocarcinoma, NOS; Papillary cystadenocarcinoma, NOS; Papillary serous cystadenocarcinoma; Mucinous cystadenocarcinoma, NOS; Mucinous adenocarcinoma; Signet ring cell carcinoma; Infiltrating duct carcinoma; Medullary carcinoma, NOS; Lobular carcinoma; Inflammatory carcinoma; Paget's disease, mammary; Acinar cell carcinoma; Adenosquamous carcinoma; Adenocarcinoma w/ squamous metaplasia; Thymoma, malignant; Ovarian stromal tumor, malignant; Thecoma, malignant; Granulosa cell tumor, malignant; Androblastoma, malignant; Sertoli cell carcinoma; Leydig cell tumor, malignant; Lipid cell tumor, malignant; Paraganglioma, malignant; Extra-mammary paraganglioma, malignant; Pheochromocytoma; Glomangiosarcoma; Malignant melanoma, NOS; Amelanotic melanoma; Superficial spreading melanoma; Malig melanoma in giant pigmented nevus; Epithelioid cell melanoma; Blue nevus, malignant; Sarcoma, NOS; Fibrosarcoma, NOS; Fibrous histiocytoma, malignant; Myxosarcoma; Liposarcoma, NOS; Leiomyosarcoma, NOS; Rhabdomyosarcoma, NOS; Embryonal rhabdomyosarcoma; Alveolar rhabdomyosarcoma; Stromal sarcoma, NOS; Mixed tumor, malignant, NOS; Mullerian mixed tumor; Nephroblastoma; Hepatoblastoma; Carcinosarcoma, NOS; Mesenchymoma, malignant; Brenner tumor, malignant; Phyllodes

tumor, malignant; Synovial sarcoma, NOS; Mesothelioma, malignant; Dysgerminoma; Embryonal carcinoma, NOS; Teratoma, malignant, NOS; Struma ovarii, malignant; Choriocarcinoma; Mesonephroma, malignant; Hemangiosarcoma; Hemangioendothelioma, malignant; Kaposi's sarcoma; Hemangiopericytoma, malignant; Lymphangiosarcoma;

5 Osteosarcoma, NOS; Juxtacortical osteosarcoma; Chondrosarcoma, NOS; Chondroblastoma, malignant; Mesenchymal chondrosarcoma; Giant cell tumor of bone; Ewing's sarcoma; Odontogenic tumor, malignant; Ameloblastic odontosarcoma; Ameloblastoma, malignant; Ameloblastic fibrosarcoma; Pinealoma, malignant; Chordoma; Glioma, malignant; Ependymoma, NOS; Astrocytoma, NOS; Protoplasmic astrocytoma;

10 Fibrillary astrocytoma; Astroblastoma; Glioblastoma, NOS; Oligodendroglioma, NOS; Oligodendroblastoma; Primitive neuroectodermal; Cerebellar sarcoma, NOS; Ganglioneuroblastoma; Neuroblastoma, NOS; Retinoblastoma, NOS; Olfactory neurogenic tumor; Meningioma, malignant; Neurofibrosarcoma; Neurilemmoma, malignant; Granular cell tumor, malignant; Malignant lymphoma, NOS; Hodgkin's disease, NOS; Hodgkin's;

15 paragranuloma, NOS; Malignant lymphoma, small lymphocytic; Malignant lymphoma, large cell, diffuse; Malignant lymphoma, follicular, NOS; Mycosis fungoides; Other specified non-Hodgkin's lymphomas; Malignant histiocytosis; Multiple myeloma; Mast cell sarcoma; Immunoproliferative small intestinal disease; Leukemia, NOS; Lymphoid leukemia, NOS; Plasma cell leukemia; Erythroleukemia; Lymphosarcoma cell leukemia; Myeloid leukemia,

20 NOS; Basophilic leukemia; Eosinophilic leukemia; Monocytic leukemia, NOS; Mast cell leukemia; Megakaryoblastic leukemia; Myeloid sarcoma; and Hairy cell leukemia.

In addition, the genes may be involved in other diseases, such as but not limited to diseases associated with aging or neurodegenerative diseases.

25 Association in this context means that the nucleotide or protein sequences are either differentially expressed, activated, inactivated or altered in carcinomas as compared to normal tissue. As outlined below, CA sequences include those that are up-regulated (i.e. expressed at a higher level), as well as those that are down-regulated (i.e. expressed at a

30 lower level), in carcinomas. CA sequences also include sequences which have been altered (i.e., truncated sequences or sequences with substitutions, deletions or insertions, including point mutations) and show either the same expression profile or an altered profile. In a preferred embodiment, the CA sequences are from humans; however, as will be appreciated by those in the art, CA sequences from other organisms may be useful in animal models of

35 disease and drug evaluation; thus, other CA sequences are provided, from vertebrates, including mammals, including rodents (rats, mice, hamsters, guinea pigs, etc.), primates, farm animals (including sheep, goats, pigs, cows, horses, etc). In some cases, prokaryotic CA sequences may be useful. CA sequences from other organisms may be obtained using the techniques outlined below.

CA sequences can include both nucleic acid and amino acid sequences. In a preferred embodiment, the CA sequences are recombinant nucleic acids. By the term "recombinant nucleic acid" herein is meant nucleic acid, originally formed in vitro, in general, by the manipulation of nucleic acid by polymerases and endonucleases, in a form not normally found in nature. Thus an isolated nucleic acid, in a linear form, or an expression vector formed in vitro by ligating DNA molecules that are not normally joined, are both considered recombinant for the purposes of this invention. It is understood that once a recombinant nucleic acid is made and reintroduced into a host cell or organism, it will replicate non-recombinantly, i.e. using the in vivo cellular machinery of the host cell rather than in vitro manipulations; however, such nucleic acids, once produced recombinantly, although subsequently replicated non-recombinantly, are still considered recombinant for the purposes of the invention.

Similarly, a "recombinant protein" is a protein made using recombinant techniques, i.e. through the expression of a recombinant nucleic acid as depicted above. A recombinant protein is distinguished from naturally occurring protein by at least one or more characteristics. For example, the protein may be isolated or purified away from some or all of the proteins and compounds with which it is normally associated in its wild type host, and thus may be substantially pure. For example, an isolated protein is unaccompanied by at least some of the material with which it is normally associated in its natural state, preferably constituting at least about 0.5%, more preferably at least about 5% by weight of the total protein in a given sample. A substantially pure protein comprises at least about 75% by weight of the total protein, with at least about 80% being preferred, and at least about 90% being particularly preferred. The definition includes the production of an CA protein from one organism in a different organism or host cell. Alternatively, the protein may be made at a significantly higher concentration than is normally seen, through the use of an inducible promoter or high expression promoter, such that the protein is made at increased concentration levels. Alternatively, the protein may be in a form not normally found in nature, as in the addition of an epitope tag or amino acid substitutions, insertions and deletions, as discussed below.

In a preferred embodiment, the CA sequences are nucleic acids. As will be appreciated by those in the art and is more fully outlined below, CA sequences are useful in a variety of applications, including diagnostic applications, which will detect naturally occurring nucleic acids, as well as screening applications; for example, biochips comprising nucleic acid probes to the CA sequences can be generated. In the broadest sense, then, by "nucleic acid" or "oligonucleotide" or grammatical equivalents herein means at least two nucleotides covalently linked together. A nucleic acid of the present invention will generally contain phosphodiester bonds, although in some cases, as outlined below (for example in antisense

applications or when a candidate agent is a nucleic acid), nucleic acid analogs may be used that have alternate backbones, comprising, for example, phosphoramidate (Beaucage et al., Tetrahedron 49(10):1925 (1993) and references therein; Letsinger, J. Org. Chem. 35:3800 (1970); Sprinzl et al., Eur. J. Biochem. 81:579 (1977); Letsinger et al., Nucl. Acids Res. 14:3487 (1986); Sawai et al., Chem. Lett. 805 (1984), Letsinger et al., J. Am. Chem. Soc. 110:4470 (1988); and Pauwels et al., Chemica Scripta 26:141 (1986)), phosphorothioate (Mag et al., Nucleic Acids Res. 19:1437 (1991); and U.S. Patent No. 5,644,048), phosphorodithioate (Briu et al., J. Am. Chem. Soc. 111:2321 (1989), O-methylphosphoroamidite linkages (see Eckstein, Oligonucleotides and Analogues: A Practical Approach, Oxford University Press), and peptide nucleic acid backbones and linkages (see Egholm, J. Am. Chem. Soc. 114:1895 (1992); Meier et al., Chem. Int. Ed. Engl. 31:1008 (1992); Nielsen, Nature, 365:566 (1993); Carlsson et al., Nature 380:207 (1996), all of which are incorporated by reference). Other analog nucleic acids include those with positive backbones (Denpcy et al., Proc. Natl. Acad. Sci. USA 92:6097 (1995); non-ionic backbones (U.S. Patent Nos. 5,386,023, 5,637,684, 5,602,240, 5,216,141 and 4,469,863; Kiedrowski et al., Angew. Chem. Intl. Ed. English 30:423 (1991); Letsinger et al., J. Am. Chem. Soc. 110:4470 (1988); Letsinger et al., Nucleoside & Nucleotide 13:1597 (1994); Chapters 2 and 3, ASC Symposium Series 580, "Carbohydrate Modifications in Antisense Research", Ed. Y.S. Sanghui and P. Dan Cook; Mesmaeker et al., Bioorganic & Medicinal Chem. Lett. 4:395 (1994); Jeffs et al., J. Biomolecular NMR 34:17 (1994); Tetrahedron Lett. 37:743 (1996)) and non-ribose backbones, including those described in U.S. Patent Nos. 5,235,033 and 5,034,506, and Chapters 6 and 7, ASC Symposium Series 580, "Carbohydrate Modifications in Antisense Research", Ed. Y.S. Sanghui and P. Dan Cook. Nucleic acids containing one or more carbocyclic sugars are also included within one definition of nucleic acids (see Jenkins et al., Chem. Soc. Rev. (1995) pp169-176). Several nucleic acid analogs are described in Rawls, C & E News June 2, 1997 page 35. All of these references are hereby expressly incorporated by reference. These modifications of the ribose-phosphate backbone may be done for a variety of reasons, for example to increase the stability and half-life of such molecules in physiological environments for use in anti-sense applications or as probes on a biochip.

As will be appreciated by those in the art, all of these nucleic acid analogs may find use in the present invention. In addition, mixtures of naturally occurring nucleic acids and analogs can be made; alternatively, mixtures of different nucleic acid analogs, and mixtures of naturally occurring nucleic acids and analogs may be made.

The nucleic acids may be single stranded or double stranded, as specified, or contain portions of both double stranded or single stranded sequence. As will be appreciated by those in the art, the depiction of a single strand "Watson" also defines the sequence of the

other strand "Crick"; thus the sequences described herein also includes the complement of the sequence. The nucleic acid may be DNA, both genomic and cDNA, RNA or a hybrid, where the nucleic acid contains any combination of deoxyribo- and ribo-nucleotides, and any combination of bases, including uracil, adenine, thymine, cytosine, guanine, inosine, xanthine hypoxanthine, isocytosine, isoguanine, etc. As used herein, the term "nucleoside" includes nucleotides and nucleoside and nucleotide analogs, and modified nucleosides such as amino modified nucleosides. In addition, "nucleoside" includes non-naturally occurring analog structures. Thus for example the individual units of a peptide nucleic acid, each containing a base, are referred to herein as a nucleoside.

10

An CA sequence can be initially identified by substantial nucleic acid and/or amino acid sequence homology to the CA sequences outlined herein. Such homology can be based upon the overall nucleic acid or amino acid sequence, and is generally determined as outlined below, using either homology programs or hybridization conditions.

15

The CA sequences of the invention were initially identified as described herein; basically, infection of mice with murine leukemia viruses (MLV) resulted in lymphoma, although many of these sequences will also be involved in other cancers as is generally outlined herein.

20

The CA sequences outlined herein comprise the insertion sites for the virus. In general, the retrovirus can cause carcinomas in three basic ways: first of all, by inserting upstream of a normally silent host gene and activating it (e.g. promoter insertion); secondly, by truncating a host gene that leads to oncogenesis; or by enhancing the transcription of a neighboring gene. For example, retrovirus enhancers, including SL3-3, are known to act on genes up to approximately 200 kilobases of the insertion site.

25

In a preferred embodiment, CA sequences are those that are up-regulated in carcinomas; that is, the expression of these genes is higher in carcinoma tissue as compared to normal tissue of the same differentiation stage. "Up-regulation" as used herein means at least about 50%, more preferably at least about 100%, more preferably at least about 150%, more preferably, at least about 200%, with from 300 to at least 1000% being especially preferred.

30

In a preferred embodiment, CA sequences are those that are down-regulated in carcinomas; that is, the expression of these genes is lower in carcinoma tissue as compared to normal tissue of the same differentiation stage. "Down-regulation" as used herein means at least about 50%, more preferably at least about 100%, more preferably at least about 150%, more preferably, at least about 200%, with from 300 to at least 1000% being especially preferred.

35

In a preferred embodiment, CA sequences are those that are altered but show either the

same

expression profile or an altered profile as compared to normal lymphoid tissue of the same differentiation stage. "Altered CA sequences" as used herein refers to sequences which are truncated, contain insertions or contain point mutations.

5

CA proteins of the present invention may be classified as secreted proteins, transmembrane proteins or intracellular proteins.

10

In a preferred embodiment the CA protein is an intracellular protein. Intracellular proteins may be found in the cytoplasm and/or in the nucleus. Intracellular proteins are involved in all aspects of cellular function and replication (including, for example, signaling pathways); aberrant expression of such proteins results in unregulated or dysregulated cellular processes. For example, many intracellular proteins have enzymatic activity such as protein kinase activity, protein phosphatase activity, protease activity, nucleotide cyclase activity, polymerase activity and the like. Intracellular proteins also serve as docking proteins that are involved in organizing complexes of proteins, or targeting proteins to various subcellular localizations, and are involved in maintaining the structural integrity of organelles.

15

20

An increasingly appreciated concept in characterizing intracellular proteins is the presence in the proteins of one or more motifs for which defined functions have been attributed. In addition to the highly conserved sequences found in the enzymatic domain of proteins, highly conserved sequences have been identified in proteins that are involved in protein-protein interaction. For example, Src-homology-2 (SH2) domains bind tyrosine-phosphorylated targets in a sequence dependent manner. PTB domains, which are distinct from SH2 domains, also bind tyrosine phosphorylated targets. SH3 domains bind to proline-rich targets. In addition, PH domains, tetratricopeptide repeats and WD domains to name only a few, have been shown to mediate protein-protein interactions. Some of these may also be involved in binding to phospholipids or other second messengers. As will be appreciated by one of ordinary skill in the art, these motifs can be identified on the basis of primary sequence; thus, an analysis of the sequence of proteins may provide insight into both the enzymatic potential of the molecule and/or molecules with which the protein may associate.

25

30

35

In a preferred embodiment, the CA sequences are transmembrane proteins. Transmembrane proteins are molecules that span the phospholipid bilayer of a cell. They may have an intracellular domain, an extracellular domain, or both. The intracellular domains of such proteins may have a number of functions including those already described for intracellular proteins. For example, the intracellular domain may have enzymatic activity and/or may serve as a binding site for additional proteins. Frequently the intracellular domain of transmembrane proteins serves both roles. For example certain receptor tyrosine kinases

have both protein kinase activity and SH2 domains. In addition, autophosphorylation of tyrosines on the receptor molecule itself, creates binding sites for additional SH2 domain containing proteins.

5 Transmembrane proteins may contain from one to many transmembrane domains. For example, receptor tyrosine kinases, certain cytokine receptors, receptor guanylyl cyclases and receptor serine/threonine protein kinases contain a single transmembrane domain. However, various other proteins including channels and adenylyl cyclases contain numerous transmembrane domains. Many important cell surface receptors are classified as "seven
10 transmembrane domain" proteins, as they contain 7 membrane spanning regions. Important transmembrane protein receptors include, but are not limited to insulin receptor, insulin_like growth factor receptor, human growth hormone receptor, glucose transporters, transferrin receptor, epidermal growth factor receptor, low density lipoprotein receptor, epidermal growth factor receptor, leptin receptor, interleukin receptors, e.g. IL_1 receptor, IL_2 receptor, etc.

15 Characteristics of transmembrane domains include approximately 20 consecutive hydrophobic amino acids that may be followed by charged amino acids. Therefore, upon analysis of the amino acid sequence of a particular protein, the localization and number of transmembrane domains within the protein may be predicted.

20 The extracellular domains of transmembrane proteins are diverse; however, conserved motifs are found repeatedly among various extracellular domains. Conserved structure and/or functions have been ascribed to different extracellular motifs. For example, cytokine receptors are characterized by a cluster of cysteines and a WSXWS (W= tryptophan, S=
25 serine, X=any amino acid) motif. Immunoglobulin-like domains are highly conserved. Mucin-like domains may be involved in cell adhesion and leucine-rich repeats participate in protein-protein interactions.

Many extracellular domains are involved in binding to other molecules. In one aspect,
30 extracellular domains are receptors. Factors that bind the receptor domain include circulating ligands, which may be peptides, proteins, or small molecules such as adenosine and the like. For example, growth factors such as EGF, FGF and PDGF are circulating growth factors that bind to their cognate receptors to initiate a variety of cellular responses. Other factors include cytokines, mitogenic factors, neurotrophic factors and the like. Extracellular domains also
35 bind to cell-associated molecules. In this respect, they mediate cell-cell interactions. Cell-associated ligands can be tethered to the cell for example via a glycosylphosphatidylinositol (GPI) anchor, or may themselves be transmembrane proteins. Extracellular domains also associate with the extracellular matrix and contribute to the maintenance of the cell structure.

CA proteins that are transmembrane are particularly preferred in the present invention as they are good targets for immunotherapeutics, as are described herein. In addition, as outlined below, transmembrane proteins can be also useful in imaging modalities.

5 It will also be appreciated by those in the art that a transmembrane protein can be made soluble by removing transmembrane sequences, for example through recombinant methods. Furthermore, transmembrane proteins that have been made soluble can be made to be secreted through recombinant means by adding an appropriate signal sequence.

10 In a preferred embodiment, the CA proteins are secreted proteins; the secretion of which can be either constitutive or regulated. These proteins have a signal peptide or signal sequence that targets the molecule to the secretory pathway. Secreted proteins are involved in numerous physiological events; by virtue of their circulating nature, they serve to transmit signals to various other cell types. The secreted protein may function in an autocrine manner
15 (acting on the cell that secreted the factor), a paracrine manner (acting on cells in close proximity to the cell that secreted the factor) or an endocrine manner (acting on cells at a distance). Thus secreted molecules find use in modulating or altering numerous aspects of physiology. CA proteins that are secreted proteins are particularly preferred in the present invention as they serve as good targets for diagnostic markers, for example for blood tests.

20 An CA sequence is initially identified by substantial nucleic acid and/or amino acid sequence homology to the CA sequences outlined herein. Such homology can be based upon the overall nucleic acid or amino acid sequence, and is generally determined as outlined below, using either homology programs or hybridization conditions.

25 As used herein, a nucleic acid is a "CA nucleic acid" if the overall homology of the nucleic acid sequence to one of the nucleic acids of Tables 1-112 is preferably greater than about 75%, more preferably greater than about 80%, even more preferably greater than about 85% and most preferably greater than 90%. In some embodiments the homology will be as high
30 as about 93 to 95 or 98%. In a preferred embodiment, the sequences which are used to determine sequence identity or similarity are selected from those of the nucleic acids of Tables 1-112. In another embodiment, the sequences are naturally occurring allelic variants of the sequences of the nucleic acids of Tables 1-112. In another embodiment, the sequences are sequence variants as further described herein.

35 Homology in this context means sequence similarity or identity, with identity being preferred. A preferred comparison for homology purposes is to compare the sequence containing sequencing errors to the correct sequence. This homology will be determined using standard techniques known in the art, including, but not limited to, the local homology algorithm of

Smith & Waterman, Adv. Appl. Math. 2:482 (1981), by the homology alignment algorithm of Needleman & Wunsch, J. Mol. Biol. 48:443 (1970), by the search for similarity method of Pearson & Lipman, PNAS USA 85:2444 (1988), by computerized implementations of these algorithms (GAP, BESTFIT, FASTA, and TFASTA in the Wisconsin Genetics Software Package, Genetics Computer Group, 575 Science Drive, Madison, WI), the Best Fit sequence program described by Devereux et al., Nucl. Acid Res. 12:387-395 (1984), preferably using the default settings, or by inspection.

One example of a useful algorithm is PILEUP. PILEUP creates a multiple sequence alignment from a group of related sequences using progressive, pairwise alignments. It can also plot a tree showing the clustering relationships used to create the alignment. PILEUP uses a simplification of the progressive alignment method of Feng & Doolittle, J. Mol. Evol. 35:351-360 (1987); the method is similar to that described by Higgins & Sharp CABIOS 5:151-153 (1989). Useful PILEUP parameters including a default gap weight of 3.00, a default gap length weight of 0.10, and weighted end gaps.

Another example of a useful algorithm is the BLAST algorithm, described in Altschul et al., J. Mol. Biol. 215, 403-410, (1990) and Karlin et al., PNAS USA 90:5873-5787 (1993). A particularly useful BLAST program is the WU-BLAST-2 program which was obtained from Altschul et al., Methods in Enzymology, 266: 460-480 (1996); <http://blast.wustl.edu>. WU-BLAST-2 uses several search parameters, most of which are set to the default values. The adjustable parameters are set with the following values: overlap span = 1, overlap fraction = 0.125, word threshold (T) = 11. The HSP S and HSP S2 parameters are dynamic values and are established by the program itself depending upon the composition of the particular sequence and composition of the particular database against which the sequence of interest is being searched; however, the values may be adjusted to increase sensitivity. A % amino acid sequence identity value is determined by the number of matching identical residues divided by the total number of residues of the "longer" sequence in the aligned region. The "longer" sequence is the one having the most actual residues in the aligned region (gaps introduced by WU-Blast-2 to maximize the alignment score are ignored).

Thus, "percent (%) nucleic acid sequence identity" is defined as the percentage of nucleotide residues in a candidate sequence that are identical with the nucleotide residues of the nucleic acids of Tables 1-112. A preferred method utilizes the BLASTN module of WU-BLAST-2 set to the default parameters, with overlap span and overlap fraction set to 1 and 0.125, respectively.

The alignment may include the introduction of gaps in the sequences to be aligned. In addition, for sequences which contain either more or fewer nucleotides than those of the nucleic acids of Tables 1-112, it is understood that the percentage of homology will be

determined based on the number of homologous nucleosides in relation to the total number of nucleosides. Thus, for example, homology of sequences shorter than those of the sequences identified herein and as discussed below, will be determined using the number of nucleosides in the shorter sequence.

5

In one embodiment, the nucleic acid homology is determined through hybridization studies. Thus, for example, nucleic acids which hybridize under high stringency to the nucleic acids identified in the figures, or their complements, are considered CA sequences. High stringency conditions are known in the art; see for example Maniatis et al., Molecular Cloning: A Laboratory Manual, 2d Edition, 1989, and Short Protocols in Molecular Biology, ed. Ausubel, et al., both of which are hereby incorporated by reference. Stringent conditions are sequence-dependent and will be different in different circumstances. Longer sequences hybridize specifically at higher temperatures. An extensive guide to the hybridization of nucleic acids is found in Tijssen, Techniques in Biochemistry and Molecular Biology—Hybridization with Nucleic Acid Probes, "Overview of principles of hybridization and the strategy of nucleic acid assays" (1993). Generally, stringent conditions are selected to be about 5-10°C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength pH. The T_m is the temperature (under defined ionic strength, pH and nucleic acid concentration) at which 50% of the probes complementary to the target hybridize to the target sequence at equilibrium (as the target sequences are present in excess, at T_m , 50% of the probes are occupied at equilibrium). Stringent conditions will be those in which the salt concentration is less than about 1.0 M sodium ion, typically about 0.01 to 1.0 M sodium ion concentration (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30°C for short probes (e.g. 10 to 50 nucleotides) and at least about 60°C for long probes (e.g. greater than 50 nucleotides). Stringent conditions may also be achieved with the addition of destabilizing agents such as formamide.

In another embodiment, less stringent hybridization conditions are used; for example, moderate or low stringency conditions may be used, as are known in the art; see Maniatis and Ausubel, *supra*, and Tijssen, *supra*.

30

In addition, the CA nucleic acid sequences of the invention are fragments of larger genes, i.e. they are nucleic acid segments. Alternatively, the CA nucleic acid sequences can serve as indicators of oncogene position, for example, the CA sequence may be an enhancer that activates a protooncogene. "Genes" in this context includes coding regions, non-coding regions, and mixtures of coding and non-coding regions. Accordingly, as will be appreciated by those in the art, using the sequences provided herein, additional sequences of the CA genes can be obtained, using techniques well known in the art for cloning either longer sequences or the full length sequences; see Maniatis et al., and Ausubel, et al., *supra*, hereby expressly incorporated by reference. In general, this is done using PCR, for example, kinetic

35

PCR.

Once the CA nucleic acid is identified, it can be cloned and, if necessary, its constituent parts recombined to form the entire CA nucleic acid. Once isolated from its natural source, e.g.,
5 contained within a plasmid or other vector or excised therefrom as a linear nucleic acid segment, the recombinant CA nucleic acid can be further used as a probe to identify and isolate other CA nucleic acids, for example additional coding regions. It can also be used as a "precursor" nucleic acid to make modified or variant CA nucleic acids and proteins.

10 The CA nucleic acids of the present invention are used in several ways. In a first embodiment, nucleic acid probes to the CA nucleic acids are made and attached to biochips to be used in screening and diagnostic methods, as outlined below, or for administration, for example for gene therapy and/or antisense applications. Alternatively, the CA nucleic acids that include coding regions of CA proteins can be put into expression vectors for the
15 expression of CA proteins, again either for screening purposes or for administration to a patient.

In a preferred embodiment, nucleic acid probes to CA nucleic acids (both the nucleic acid sequences outlined in the figures and/or the complements thereof) are made. The nucleic
20 acid probes attached to the biochip are designed to be substantially complementary to the CA nucleic acids, i.e. the target sequence (either the target sequence of the sample or to other probe sequences, for example in sandwich assays), such that hybridization of the target sequence and the probes of the present invention occurs. As outlined below, this complementarity need not be perfect; there may be any number of base pair mismatches
25 which will interfere with hybridization between the target sequence and the single stranded nucleic acids of the present invention. However, if the number of mutations is so great that no hybridization can occur under even the least stringent of hybridization conditions, the sequence is not a complementary target sequence. Thus, by "substantially complementary" herein is meant that the probes are sufficiently complementary to the target sequences to
30 hybridize under normal reaction conditions, particularly high stringency conditions, as outlined herein.

A nucleic acid probe is generally single stranded but can be partially single and partially double stranded. The strandedness of the probe is dictated by the structure, composition,
35 and properties of the target sequence. In general, the nucleic acid probes range from about 8 to about 100 bases long, with from about 10 to about 80 bases being preferred, and from about 30 to about 50 bases being particularly preferred. That is, generally whole genes are not used. In some embodiments, much longer nucleic acids can be used, up to hundreds of bases.

In a preferred embodiment, more than one probe per sequence is used, with either overlapping probes or probes to different sections of the target being used. That is, two, three, four or more probes, with three being preferred, are used to build in a redundancy for a particular target. The probes can be overlapping (i.e. have some sequence in common), or
5 separate.

As will be appreciated by those in the art, nucleic acids can be attached or immobilized to a solid support in a wide variety of ways. By "immobilized" and grammatical equivalents herein
10 is meant the association or binding between the nucleic acid probe and the solid support is sufficient to be stable under the conditions of binding, washing, analysis, and removal as outlined below. The binding can be covalent or non-covalent. By "non-covalent binding" and grammatical equivalents herein is meant one or more of either electrostatic, hydrophilic, and hydrophobic interactions. Included in non-covalent binding is the covalent attachment of a
15 molecule, such as, streptavidin to the support and the non-covalent binding of the biotinylated probe to the streptavidin. By "covalent binding" and grammatical equivalents herein is meant that the two moieties, the solid support and the probe, are attached by at least one bond, including sigma bonds, pi bonds and coordination bonds. Covalent bonds can be formed directly between the probe and the solid support or can be formed by a cross linker or by
20 inclusion of a specific reactive group on either the solid support or the probe or both molecules. Immobilization may also involve a combination of covalent and non-covalent interactions.

In general, the probes are attached to the biochip in a wide variety of ways, as will be
25 appreciated by those in the art. As described herein, the nucleic acids can either be synthesized first, with subsequent attachment to the biochip, or can be directly synthesized on the biochip.

The biochip comprises a suitable solid substrate. By "substrate" or "solid support" or other grammatical equivalents herein is meant any material that can be modified to contain discrete individual sites appropriate for the attachment or association of the nucleic acid probes and is amenable to at least one detection method. As will be appreciated by those in the art, the number of possible substrates are very large, and include, but are not limited to, glass and modified or functionalized glass, plastics (including acrylics, polystyrene and copolymers of
30 styrene and other materials, polypropylene, polyethylene, polybutylene, polyurethanes, Teflon™, etc.), polysaccharides, nylon or nitrocellulose, resins, silica or silica_based materials including silicon and modified silicon, carbon, metals, inorganic glasses, etc. In general, the substrates allow optical detection and do not appreciably fluoresce.

In a preferred embodiment, the surface of the biochip and the probe may be derivatized with chemical functional groups for subsequent attachment of the two. Thus, for example, the biochip is derivatized with a chemical functional group including, but not limited to, amino groups, carboxy groups, oxo groups and thiol groups, with amino groups being particularly preferred. Using these functional groups, the probes can be attached using functional groups on the probes. For example, nucleic acids containing amino groups can be attached to surfaces comprising amino groups, for example using linkers as are known in the art; for example, homo-or hetero-bifunctional linkers as are well known (see 1994 Pierce Chemical Company catalog, technical section on cross_linkers, pages 155_200, incorporated herein by reference). In addition, in some cases, additional linkers, such as alkyl groups (including substituted and heteroalkyl groups) may be used.

In this embodiment, the oligonucleotides are synthesized as is known in the art, and then attached to the surface of the solid support. As will be appreciated by those skilled in the art, either the 5' or 3' terminus may be attached to the solid support, or attachment may be via an internal nucleoside.

In an additional embodiment, the immobilization to the solid support may be very strong, yet non-covalent. For example, biotinylated oligonucleotides can be made, which bind to surfaces covalently coated with streptavidin, resulting in attachment.

Alternatively, the oligonucleotides may be synthesized on the surface, as is known in the art. For example, photoactivation techniques utilizing photopolymerization compounds and techniques are used. In a preferred embodiment, the nucleic acids can be synthesized *in situ*, using well known photolithographic techniques, such as those described in WO 95/25116; WO 95/35505; U.S. Patent Nos. 5,700,637 and 5,445,934; and references cited within, all of which are expressly incorporated by reference; these methods of attachment form the basis of the Affymetrix GeneChip technology.

In addition to the solid-phase technology represented by biochip arrays, gene expression can also be quantified using liquid-phase arrays. One such system is kinetic polymerase chain reaction (PCR). Kinetic PCR allows for the simultaneous amplification and quantification of specific nucleic acid sequences. The specificity is derived from synthetic oligonucleotide primers designed to preferentially adhere to single-stranded nucleic acid sequences bracketing the target site. This pair of oligonucleotide primers form specific, non-covalently bound complexes on each strand of the target sequence. These complexes facilitate *in vitro* transcription of double-stranded DNA in opposite orientations. Temperature cycling of the reaction mixture creates a continuous cycle of primer binding, transcription, and re-melting of the nucleic acid to individual strands. The result is an exponential increase of the target

dsDNA product. This product can be quantified in real time either through the use of an intercalating dye or a sequence specific probe. SYBR® Greene I, is an example of an intercalating dye, that preferentially binds to dsDNA resulting in a concomitant increase in the fluorescent signal. Sequence specific probes, such as used with TaqMan® technology, consist of a fluorochrome and a quenching molecule covalently bound to opposite ends of an oligonucleotide. The probe is designed to selectively bind the target DNA sequence between the two primers. When the DNA strands are synthesized during the PCR reaction, the fluorochrome is cleaved from the probe by the exonuclease activity of the polymerase resulting in signal dequenching. The probe signaling method can be more specific than the intercalating dye method, but in each case, signal strength is proportional to the dsDNA product produced. Each type of quantification method can be used in multi-well liquid phase arrays with each well representing primers and/or probes specific to nucleic acid sequences of interest. When used with messenger RNA preparations of tissues or cell lines, and an array of probe/primer reactions can simultaneously quantify the expression of multiple gene products of interest. See Germer, S., et al., *Genome Res.* 10:258-266 (2000); Heid, C. A., et al., *Genome Res.* 6, 986-994 (1996).

In a preferred embodiment, CA nucleic acids encoding CA proteins are used to make a variety of expression vectors to express CA proteins which can then be used in screening assays, as described below. The expression vectors may be either self-replicating extrachromosomal vectors or vectors which integrate into a host genome. Generally, these expression vectors include transcriptional and translational regulatory nucleic acid operably linked to the nucleic acid encoding the CA protein. The term "control sequences" refers to DNA sequences necessary for the expression of an operably linked coding sequence in a particular host organism. The control sequences that are suitable for prokaryotes, for example, include a promoter, optionally an operator sequence, and a ribosome binding site. Eukaryotic cells are known to utilize promoters, polyadenylation signals, and enhancers.

Nucleic acid is "operably linked" when it is placed into a functional relationship with another nucleic acid sequence. For example, DNA for a presequence or secretory leader is operably linked to DNA for a polypeptide if it is expressed as a preprotein that participates in the secretion of the polypeptide; a promoter or enhancer is operably linked to a coding sequence if it affects the transcription of the sequence; or a ribosome binding site is operably linked to a coding sequence if it is positioned so as to facilitate translation. Generally, "operably linked" means that the DNA sequences being linked are contiguous, and, in the case of a secretory leader, contiguous and in reading phase. However, enhancers do not have to be contiguous. Linking is accomplished by ligation at convenient restriction sites. If such sites do not exist, synthetic oligonucleotide adaptors or linkers are used in accordance with conventional practice. The transcriptional and translational regulatory nucleic acid will generally be

appropriate to the host cell used to express the CA protein; for example, transcriptional and translational regulatory nucleic acid sequences from *Bacillus* are preferably used to express the CA protein in *Bacillus*. Numerous types of appropriate expression vectors, and suitable regulatory sequences are known in the art for a variety of host cells.

5

In general, the transcriptional and translational regulatory sequences may include, but are not limited to, promoter sequences, ribosomal binding sites, transcriptional start and stop sequences, translational start and stop sequences, and enhancer or activator sequences. In a preferred embodiment, the regulatory sequences include a promoter and transcriptional start and stop sequences.

10

Promoter sequences encode either constitutive or inducible promoters. The promoters may be either naturally occurring promoters or hybrid promoters. Hybrid promoters, which combine elements of more than one promoter, are also known in the art, and are useful in the present invention.

15

In addition, the expression vector may comprise additional elements. For example, the expression vector may have two replication systems, thus allowing it to be maintained in two organisms, for example in mammalian or insect cells for expression and in a procaryotic host for cloning and amplification. Furthermore, for integrating expression vectors, the expression vector contains at least one sequence homologous to the host cell genome, and preferably two homologous sequences which flank the expression construct. The integrating vector may be directed to a specific locus in the host cell by selecting the appropriate homologous sequence for inclusion in the vector. Constructs for integrating vectors are well known in the art.

20

In addition, in a preferred embodiment, the expression vector contains a selectable marker gene to allow the selection of transformed host cells. Selection genes are well known in the art and will vary with the host cell used.

25

The CA proteins of the present invention are produced by culturing a host cell transformed with an expression vector containing nucleic acid encoding an CA protein, under the appropriate conditions to induce or cause expression of the CA protein. The conditions appropriate for CA protein expression will vary with the choice of the expression vector and the host cell, and will be easily ascertained by one skilled in the art through routine experimentation. For example, the use of constitutive promoters in the expression vector will require optimizing the growth and proliferation of the host cell, while the use of an inducible promoter requires the appropriate growth conditions for induction. In addition, in some embodiments, the timing of the harvest is important. For example, the baculoviral systems used in insect cell expression are lytic viruses, and thus harvest time selection can be crucial

30

35

for product yield.

Appropriate host cells include yeast, bacteria, archaeobacteria, fungi, and insect, plant and animal cells, including mammalian cells. Of particular interest are *Drosophila melanogaster* cells, *Saccharomyces cerevisiae* and other yeasts, *E. coli*, *Bacillus subtilis*, Sf9 cells, C129
5 cells, 293 cells, *Neurospora*, BHK, CHO, COS, HeLa cells, THP1 cell line (a macrophage cell line) and human cells and cell lines.

In a preferred embodiment, the CA proteins are expressed in mammalian cells. Mammalian
10 expression systems are also known in the art, and include retroviral systems. A preferred expression vector system is a retroviral vector system such as is generally described in PCT/US97/01019 and PCT/US97/01048, both of which are hereby expressly incorporated by reference. Of particular use as mammalian promoters are the promoters from mammalian viral genes, since the viral genes are often highly expressed and have a broad host range.
15 Examples include the SV40 early promoter, mouse mammary tumor virus LTR promoter, adenovirus major late promoter, herpes simplex virus promoter, and the CMV promoter. Typically, transcription termination and polyadenylation sequences recognized by mammalian cells are regulatory regions located 3' to the translation stop codon and thus, together with the promoter elements, flank the coding sequence. Examples of transcription terminator and
20 polyadenylation signals include those derived from SV40.

The methods of introducing exogenous nucleic acid into mammalian hosts, as well as other hosts, is well known in the art, and will vary with the host cell used. Techniques include
25 dextran-mediated transfection, calcium phosphate precipitation, polybrene mediated transfection, protoplast fusion, electroporation, viral infection, encapsulation of the polynucleotide(s) in liposomes, and direct microinjection of the DNA into nuclei.

In a preferred embodiment, CA proteins are expressed in bacterial systems. Bacterial expression systems are well known in the art. Promoters from bacteriophage may also be
30 used and are known in the art. In addition, synthetic promoters and hybrid promoters are also useful; for example, the tac promoter is a hybrid of the trp and lac promoter sequences. Furthermore, a bacterial promoter can include naturally occurring promoters of non-bacterial origin that have the ability to bind bacterial RNA polymerase and initiate transcription. In addition to a functioning promoter sequence, an efficient ribosome binding site is desirable.
35 The expression vector may also include a signal peptide sequence that provides for secretion of the CA protein in bacteria. The protein is either secreted into the growth media (gram-positive bacteria) or into the periplasmic space, located between the inner and outer membrane of the cell (gram-negative bacteria). The bacterial expression vector may also include a selectable marker gene to allow for the selection of bacterial strains that have been

transformed. Suitable selection genes include genes which render the bacteria resistant to drugs such as ampicillin, chloramphenicol, erythromycin, kanamycin, neomycin and tetracycline. Selectable markers also include biosynthetic genes, such as those in the histidine, tryptophan and leucine biosynthetic pathways. These components are assembled
5 into expression vectors. Expression vectors for bacteria are well known in the art, and include vectors for *Bacillus subtilis*, *E. coli*, *Streptococcus cremoris*, and *Streptococcus lividans*, among others. The bacterial expression vectors are transformed into bacterial host cells using techniques well known in the art, such as calcium chloride treatment, electroporation, and others.

10

In one embodiment, CA proteins are produced in insect cells. Expression vectors for the transformation of insect cells, and in particular, baculovirus-based expression vectors, are well known in the art.

15

In a preferred embodiment, CA protein is produced in yeast cells. Yeast expression systems are well known in the art, and include expression vectors for *Saccharomyces cerevisiae*, *Candida albicans* and *C. maltosa*, *Hansenula polymorpha*, *Kluyveromyces fragilis* and *K. lactis*, *Pichia guillermondii* and *P. pastoris*, *Schizosaccharomyces pombe*, and *Yarrowia lipolytica*.

20

The CA protein may also be made as a fusion protein, using techniques well known in the art. Thus, for example, for the creation of monoclonal antibodies. If the desired epitope is small, the CA protein may be fused to a carrier protein to form an immunogen. Alternatively, the CA protein may be made as a fusion protein to increase expression, or for other reasons. For
25 example, when the CA protein is an CA peptide, the nucleic acid encoding the peptide may be linked to other nucleic acid for expression purposes.

In one embodiment, the CA nucleic acids, proteins and antibodies of the invention are labeled. By "labeled" herein is meant that a compound has at least one element, isotope or
30 chemical compound attached to enable the detection of the compound. In general, labels fall into three classes: a) isotopic labels, which may be radioactive or heavy isotopes; b) immune labels, which may be antibodies or antigens; and c) colored or fluorescent dyes. The labels may be incorporated into the CA nucleic acids, proteins and antibodies at any position. For example, the label should be capable of producing, either directly or indirectly, a detectable
35 signal. The detectable moiety may be a radioisotope, such as ^3H , ^{14}C , ^{32}P , ^{35}S , or ^{125}I , a fluorescent or chemiluminescent compound, such as fluorescein isothiocyanate, rhodamine, or luciferin, or an enzyme, such as alkaline phosphatase, beta-galactosidase or horseradish peroxidase. Any method known in the art for conjugating the antibody to the label may be employed, including those methods described by Hunter et al., Nature, 144:945 (1962);

David et al., *Biochemistry*, 13:1014 (1974); Pain et al., *J. Immunol. Meth.*, 40:219 (1981); and Nygren, *J. Histochem. and Cytochem.*, 30:407 (1982).

Accordingly, the present invention also provides CA protein sequences. An CA protein of the present invention may be identified in several ways. "Protein" in this sense includes proteins, polypeptides, and peptides. As will be appreciated by those in the art, the nucleic acid sequences of the invention can be used to generate protein sequences. There are a variety of ways to do this, including cloning the entire gene and verifying its frame and amino acid sequence, or by comparing it to known sequences to search for homology to provide a frame, assuming the CA protein has homology to some protein in the database being used. Generally, the nucleic acid sequences are input into a program that will search all three frames for homology. This is done in a preferred embodiment using the following NCBI Advanced BLAST parameters. The program is blastx or blastn. The database is nr. The input data is as "Sequence in FASTA format". The organism list is "none". The "expect" is 10; the filter is default. The "descriptions" is 500, the "alignments" is 500, and the "alignment view" is pairwise. The "query Genetic Codes" is standard (1). The matrix is BLOSUM62; gap existence cost is 11, per residue gap cost is 1; and the lambda ratio is .85 default. This results in the generation of a putative protein sequence.

Also included within one embodiment of CA proteins are amino acid variants of the naturally occurring sequences, as determined herein. Preferably, the variants are preferably greater than about 75% homologous to the wild-type sequence, more preferably greater than about 80%, even more preferably greater than about 85% and most preferably greater than 90%. In some embodiments the homology will be as high as about 93 to 95 or 98%. As for nucleic acids, homology in this context means sequence similarity or identity, with identity being preferred. This homology will be determined using standard techniques known in the art as are outlined above for the nucleic acid homologies.

CA proteins of the present invention may be shorter or longer than the wild type amino acid sequences. Thus, in a preferred embodiment, included within the definition of CA proteins are portions or fragments of the wild type sequences herein. In addition, as outlined above, the CA nucleic acids of the invention may be used to obtain additional coding regions, and thus additional protein sequence, using techniques known in the art.

In a preferred embodiment, the CA proteins are derivative or variant CA proteins as compared to the wild-type sequence. That is, as outlined more fully below, the derivative CA peptide will contain at least one amino acid substitution, deletion or insertion, with amino acid substitutions being particularly preferred. The amino acid substitution, insertion or deletion may occur at any residue within the CA peptide.

Also included in an embodiment of CA proteins of the present invention are amino acid sequence variants. These variants fall into one or more of three classes: substitutional, insertional or deletional variants. These variants ordinarily are prepared by site specific mutagenesis of nucleotides in the DNA encoding the CA protein, using cassette or PCR mutagenesis or other techniques well known in the art, to produce DNA encoding the variant, and thereafter expressing the DNA in recombinant cell culture as outlined above. However, variant CA protein fragments having up to about 100-150 residues may be prepared by *in vitro* synthesis using established techniques. Amino acid sequence variants are characterized by the predetermined nature of the variation, a feature that sets them apart from naturally occurring allelic or interspecies variation of the CA protein amino acid sequence. The variants typically exhibit the same qualitative biological activity as the naturally occurring analogue, although variants can also be selected which have modified characteristics as will be more fully outlined below.

While the site or region for introducing an amino acid sequence variation is predetermined, the mutation per se need not be predetermined. For example, in order to optimize the performance of a mutation at a given site, random mutagenesis may be conducted at the target codon or region and the expressed CA variants screened for the optimal combination of desired activity. Techniques for making substitution mutations at predetermined sites in DNA having a known sequence are well known, for example, M13 primer mutagenesis and LAR mutagenesis. Screening of the mutants is done using assays of CA protein activities.

Amino acid substitutions are typically of single residues; insertions usually will be on the order of from about 1 to 20 amino acids, although considerably larger insertions may be tolerated. Deletions range from about 1 to about 20 residues, although in some cases deletions may be much larger.

Substitutions, deletions, insertions or any combination thereof may be used to arrive at a final derivative. Generally these changes are done on a few amino acids to minimize the alteration of the molecule. However, larger changes may be tolerated in certain circumstances. When small alterations in the characteristics of the CA protein are desired, substitutions are generally made in accordance with the following chart:

Chart I

Original Residue

Exemplary Substitutions

Ala	Ser
Arg	Lys
Asn	Gln, His
Asp	Glu
Cys	Ser
Gln	Asn
Glu	Asp
Gly	Pro
His	Asn, Gln
Ile	Leu, Val
Leu	Ile, Val
Lys	Arg, Gln, Glu
Met	Leu, Ile
Phe	Met, Leu, Tyr
Ser	Thr
Thr	Ser
Trp	Tyr
Tyr	Trp, Phe
Val	Ile, Leu

Substantial changes in function or immunological identity are made by selecting substitutions that are less conservative than those shown in Chart I. For example, substitutions may be made which more significantly affect: the structure of the polypeptide backbone in the area of the alteration, for example the alpha-helical or beta-sheet structure; the charge or hydrophobicity of the molecule at the target site; or the bulk of the side chain. The substitutions which in general are expected to produce the greatest changes in the polypeptide's properties are those in which (a) a hydrophilic residue, e.g. seryl or threonyl is substituted for (or by) a hydrophobic residue, e.g. leucyl, isoleucyl, phenylalanyl, valyl or alanyl; (b) a cysteine or proline is substituted for (or by) any other residue; (c) a residue having an electropositive side chain, e.g. lysyl, arginyl, or histidyl, is substituted for (or by) an electronegative residue, e.g. glutamyl or aspartyl; or (d) a residue having a bulky side chain, e.g. phenylalanine, is substituted for (or by) one not having a side chain, e.g. glycine.

The variants typically exhibit the same qualitative biological activity and will elicit the same immune response as the naturally-occurring analogue, although variants also are selected to modify the characteristics of the CA proteins as needed. Alternatively, the variant may be designed such that the biological activity of the CA protein is altered. For example, glycosylation sites may be altered or removed, dominant negative mutations created, etc.

Covalent modifications of CA polypeptides are included within the scope of this invention, for example for use in screening. One type of covalent modification includes reacting targeted amino acid residues of an CA polypeptide with an organic derivatizing agent that is capable of reacting with selected side chains or the N-or C-terminal residues of an CA polypeptide.

5 Derivatization with bifunctional agents is useful, for instance, for crosslinking CA polypeptides to a water-insoluble support matrix or surface for use in the method for purifying anti-CA antibodies or screening assays, as is more fully described below. Commonly used crosslinking agents include, e.g., 1,1-bis(diazoacetyl)-2-phenylethane, glutaraldehyde, N-hydroxysuccinimide esters, for example, esters with 4-azidosalicylic acid, homobifunctional imidoesters, including disuccinimidyl esters such as 3,3'-dithiobis(succinimidylpropionate),
10 bifunctional maleimides such as bis-N-maleimido-1,8-octane and agents such as methyl-3-[(p-azidophenyl)dithio]propionimide.

Other modifications include deamidation of glutamyl and asparagyl residues to the
15 corresponding glutamyl and aspartyl residues, respectively, hydroxylation of proline and lysine, phosphorylation of hydroxyl groups of seryl, threonyl or tyrosyl residues, methylation of the α -amino groups of lysine, arginine, and histidine side chains [T.E. Creighton, *Proteins: Structure and Molecular Properties*, W.H. Freeman & Co., San Francisco, pp. 79-86 (1983)], acetylation of the N-terminal amine, and amidation of any C-terminal carboxyl group.

20 Another type of covalent modification of the CA polypeptide included within the scope of this invention comprises altering the native glycosylation pattern of the polypeptide. "Altering the native glycosylation pattern" is intended for purposes herein to mean deleting one or more carbohydrate moieties found in native sequence CA polypeptide, and/or adding one or more
25 glycosylation sites that are not present in the native sequence CA polypeptide.

Addition of glycosylation sites to CA polypeptides may be accomplished by altering the amino acid sequence thereof. The alteration may be made, for example, by the addition of, or substitution by, one or more serine or threonine residues to the native sequence CA
30 polypeptide (for O-linked glycosylation sites). The CA amino acid sequence may optionally be altered through changes at the DNA level, particularly by mutating the DNA encoding the CA polypeptide at preselected bases such that codons are generated that will translate into the desired amino acids.

35 Another means of increasing the number of carbohydrate moieties on the CA polypeptide is by chemical or enzymatic coupling of glycosides to the polypeptide. Such methods are described in the art, e.g., in WO 87/05330 published 11 September 1987, and in Aplin and Wriston, *LA Crit. Rev. Biochem.*, pp. 259-306 (1981).

Removal of carbohydrate moieties present on the CA polypeptide may be accomplished chemically or enzymatically or by mutational substitution of codons encoding for amino acid residues that serve as targets for glycosylation. Chemical deglycosylation techniques are known in the art and described, for instance, by Hakimuddin, et al., Arch. Biochem. Biophys., 259:52 (1987) and by Edge et al., Anal. Biochem., 118:131 (1981). Enzymatic cleavage of carbohydrate moieties on polypeptides can be achieved by the use of a variety of endo- and exo-glycosidases as described by Thotakura et al., Meth. Enzymol., 138:350 (1987).

Another type of covalent modification of CA comprises linking the CA polypeptide to one of a variety of nonproteinaceous polymers, e.g., polyethylene glycol, polypropylene glycol, or polyoxyalkylenes, in the manner set forth in U.S. Patent Nos. 4,640,835; 4,496,689; 4,301,144; 4,670,417; 4,791,192 or 4,179,337.

CA polypeptides of the present invention may also be modified in a way to form chimeric molecules comprising an CA polypeptide fused to another, heterologous polypeptide or amino acid sequence. In one embodiment, such a chimeric molecule comprises a fusion of an CA polypeptide with a tag polypeptide which provides an epitope to which an anti-tag antibody can selectively bind. The epitope tag is generally placed at the amino- or carboxyl-terminus of the CA polypeptide, although internal fusions may also be tolerated in some instances. The presence of such epitope-tagged forms of an CA polypeptide can be detected using an antibody against the tag polypeptide. Also, provision of the epitope tag enables the CA polypeptide to be readily purified by affinity purification using an anti-tag antibody or another type of affinity matrix that binds to the epitope tag. In an alternative embodiment, the chimeric molecule may comprise a fusion of an CA polypeptide with an immunoglobulin or a particular region of an immunoglobulin. For a bivalent form of the chimeric molecule, such a fusion could be to the Fc region of an IgG molecule.

Various tag polypeptides and their respective antibodies are well known in the art. Examples include poly-histidine (poly-his) or poly-histidine-glycine (poly-his-gly) tags; the flu HA tag polypeptide and its antibody 12CA5 [Field et al., Mol. Cell. Biol., 8:2159-2165 (1988)]; the c-myc tag and the 8F9, 3C7, 6E10, G4, B7 and 9E10 antibodies thereto [Evan et al., Molecular and Cellular Biology, 5:3610-3616 (1985)]; and the Herpes Simplex virus glycoprotein D (gD) tag and its antibody [Paborsky et al., Protein Engineering, 3(6):547-553 (1990)]. Other tag polypeptides include the Flag-peptide [Hopp et al., BioTechnology, 6:1204-1210 (1988)]; the KT3 epitope peptide [Martin et al., Science, 255:192-194 (1992)]; tubulin epitope peptide [Skinner et al., J. Biol. Chem., 266:15163-15166 (1991)]; and the T7 gene 10 protein peptide tag [Lutz-Freyermuth et al., Proc. Natl. Acad. Sci. USA, 87:6393-6397 (1990)].

Also included with the definition of CA protein in one embodiment are other CA proteins of the

CA family, and CA proteins from other organisms, which are cloned and expressed as outlined below. Thus, probe or degenerate polymerase chain reaction (PCR) primer sequences may be used to find other related CA proteins from humans or other organisms. As will be appreciated by those in the art, particularly useful probe and/or PCR primer sequences include the unique areas of the CA nucleic acid sequence. As is generally known in the art, preferred PCR primers are from about 15 to about 35 nucleotides in length, with from about 20 to about 30 being preferred, and may contain inosine as needed. The conditions for the PCR reaction are well known in the art.

10 In addition, as is outlined herein, CA proteins can be made that are longer than those encoded by the nucleic acids of the figures, for example, by the elucidation of additional sequences, the addition of epitope or purification tags, the addition of other fusion sequences, etc.

15 CA proteins may also be identified as being encoded by CA nucleic acids. Thus, CA proteins are encoded by nucleic acids that will hybridize to the sequences of the sequence listings, or their complements, as outlined herein.

In a preferred embodiment, the invention provides CA antibodies. In a preferred embodiment, when the CA protein is to be used to generate antibodies, for example for immunotherapy, the CA protein should share at least one epitope or determinant with the full length protein. By "epitope" or "determinant" herein is meant a portion of a protein which will generate and/or bind an antibody or T-cell receptor in the context of MHC. Thus, in most instances, antibodies made to a smaller CA protein will be able to bind to the full length protein. In a preferred embodiment, the epitope is unique; that is, antibodies generated to a unique epitope show little or no cross-reactivity.

In one embodiment, the term "antibody" includes antibody fragments, as are known in the art, including Fab, Fab₂, single chain antibodies (Fv for example), chimeric antibodies, etc., either produced by the modification of whole antibodies or those synthesized de novo using recombinant DNA technologies.

Methods of preparing polyclonal antibodies are known to the skilled artisan. Polyclonal antibodies can be raised in a mammal, for example, by one or more injections of an immunizing agent and, if desired, an adjuvant. Typically, the immunizing agent and/or adjuvant will be injected in the mammal by multiple subcutaneous or intraperitoneal injections. The immunizing agent may include a protein encoded by a nucleic acid of the figures or fragment thereof or a fusion protein thereof. It may be useful to conjugate the immunizing agent to a protein known to be immunogenic in the mammal being immunized. Examples of

such immunogenic proteins include but are not limited to keyhole limpet hemocyanin, serum albumin, bovine thyroglobulin, and soybean trypsin inhibitor. Examples of adjuvants which may be employed include Freund's complete adjuvant and MPL-TDM adjuvant (monophosphoryl Lipid A, synthetic trehalose dicorynomycolate). The immunization protocol
5 may be selected by one skilled in the art without undue experimentation.

The antibodies may, alternatively, be monoclonal antibodies. Monoclonal antibodies may be prepared using hybridoma methods, such as those described by Kohler and Milstein, *Nature*, 256:495 (1975). In a hybridoma method, a mouse, hamster, or other appropriate host animal,
10 is typically immunized with an immunizing agent to elicit lymphocytes that produce or are capable of producing antibodies that will specifically bind to the immunizing agent. Alternatively, the lymphocytes may be immunized *in vitro*. The immunizing agent will typically include a polypeptide encoded by a nucleic acid of Tables 1-112, or fragment thereof or a fusion protein thereof. Generally, either peripheral blood lymphocytes ("PBLs") are used if
15 cells of human origin are desired, or spleen cells or lymph node cells are used if non-human mammalian sources are desired. The lymphocytes are then fused with an immortalized cell line using a suitable fusing agent, such as polyethylene glycol, to form a hybridoma cell [Goding, *Monoclonal Antibodies: Principles and Practice*, Academic Press, (1986) pp. 59-103]. Immortalized cell lines are usually transformed mammalian cells, particularly myeloma
20 cells of rodent, bovine and human origin. Usually, rat or mouse myeloma cell lines are employed. The hybridoma cells may be cultured in a suitable culture medium that preferably contains one or more substances that inhibit the growth or survival of the unfused, immortalized cells. For example, if the parental cells lack the enzyme hypoxanthine guanine phosphoribosyl transferase (HGPRT or HPRT), the culture medium for the hybridomas
25 typically will include hypoxanthine, aminopterin, and thymidine ("HAT medium"), which substances prevent the growth of HGPRT-deficient cells.

In one embodiment, the antibodies are bispecific antibodies. Bispecific antibodies are monoclonal, preferably human or humanized, antibodies that have binding specificities for at
30 least two different antigens. In the present case, one of the binding specificities is for a protein encoded by a nucleic acid of Tables 1-112, or a fragment thereof, the other one is for any other antigen, and preferably for a cell-surface protein or receptor or receptor subunit, preferably one that is tumor specific.

In a preferred embodiment, the antibodies to CA are capable of reducing or eliminating the biological function of CA, as is described below. That is, the addition of anti-CA antibodies (either polyclonal or preferably monoclonal) to CA (or cells containing CA) may reduce or eliminate the CA activity. Generally, at least a 25% decrease in activity is preferred, with at
35 least about 50% being particularly preferred and about a 95-100% decrease being especially

preferred.

In a preferred embodiment the antibodies to the CA proteins are humanized antibodies. Humanized forms of non_human (e.g., murine) antibodies are chimeric molecules of immunoglobulins, immunoglobulin chains or fragments thereof (such as Fv, Fab, Fab', F(ab')₂ or other antigen binding subsequences of antibodies) which contain minimal sequence derived from non_human immunoglobulin. Humanized antibodies include human immunoglobulins (recipient antibody) in which residues form a complementary determining region (CDR) of the recipient are replaced by residues from a CDR of a non_human species (donor antibody) such as mouse, rat or rabbit having the desired specificity, affinity and capacity. In some instances, Fv framework residues of the human immunoglobulin are replaced by corresponding non_human residues. Humanized antibodies may also comprise residues which are found neither in the recipient antibody nor in the imported CDR or framework sequences. In general, the humanized antibody will comprise substantially all of at least one, and typically two, variable domains, in which all or substantially all of the CDR regions correspond to those of a non_human immunoglobulin and all or substantially all of the framework residues (FR) regions are those of a human immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at least a portion of an immunoglobulin constant region (Fc), typically that of a human immunoglobulin [Jones et al., Nature, 321:522_525 (1986); Riechmann et al., Nature, 332:323_329 (1988); and Presta, Curr. Op. Struct. Biol., 2:593_596 (1992)].

Methods for humanizing non_human antibodies are well known in the art. Generally, a humanized antibody has one or more amino acid residues introduced into it from a source which is non_human. These non_human amino acid residues are often referred to as import residues, which are typically taken from an import variable domain. Humanization can be essentially performed following the method of Winter and co_workers [Jones et al., Nature, 321:522_525 (1986); Riechmann et al., Nature, 332:323_327 (1988); Verhoeven et al., Science, 239:1534_1536 (1988)], by substituting rodent CDRs or CDR sequences for the corresponding sequences of a human antibody. Accordingly, such humanized antibodies are chimeric antibodies (U.S. Patent No. 4,816,567), wherein substantially less than an intact human variable domain has been substituted by the corresponding sequence from a non_human species. In practice, humanized antibodies are typically human antibodies in which some CDR residues and possibly some FR residues are substituted by residues from analogous sites in rodent antibodies.

Human antibodies can also be produced using various techniques known in the art, including phage display libraries [Hoogenboom and Winter, J. Mol. Biol., 227:381 (1991); Marks et al., J. Mol. Biol., 222:581 (1991)]. The techniques of Cole et al. and Boerner et al. are also

available for the preparation of human monoclonal antibodies [Cole et al., Monoclonal Antibodies and Cancer Therapy, Alan R. Liss, p. 77 (1985) and Boerner et al., J. Immunol., 147(1):86_95 (1991)]. Similarly, human antibodies can be made by introducing human immunoglobulin loci into transgenic animals, e.g., mice in which the endogenous

5 immunoglobulin genes have been partially or completely inactivated. Upon challenge, human antibody production is observed, which closely resembles that seen in humans in all respects, including gene rearrangement, assembly, and antibody repertoire. This approach is described, for example, in U.S. Patent Nos. 5,545,807; 5,545,806; 5,569,825; 5,625,126; 5,633,425; 5,661,016, and in the following scientific publications: Marks et al.,

10 Bio/Technology 10, 779_783 (1992); Lonberg et al., Nature 368 856_859 (1994); Morrison, Nature 368, 812_13 (1994); Fishwild et al., Nature Biotechnology 14, 845_51 (1996); Neuberger, Nature Biotechnology 14, 826 (1996); Lonberg and Huszar, Intern. Rev. Immunol. 13 65_93 (1995).

15 By immunotherapy is meant treatment of a carcinoma with an antibody raised against an CA protein. As used herein, immunotherapy can be passive or active. Passive immunotherapy as defined herein is the passive transfer of antibody to a recipient (patient). Active immunization is the induction of antibody and/or T-cell responses in a recipient (patient). Induction of an immune response is the result of providing the recipient with an antigen to

20 which antibodies are raised. As appreciated by one of ordinary skill in the art, the antigen may be provided by injecting a polypeptide against which antibodies are desired to be raised into a recipient, or contacting the recipient with a nucleic acid capable of expressing the antigen and under conditions for expression of the antigen.

25 In a preferred embodiment, oncogenes which encode secreted growth factors may be inhibited by raising antibodies against CA proteins that are secreted proteins as described above. Without being bound by theory, antibodies used for treatment, bind and prevent the secreted protein from binding to its receptor, thereby inactivating the secreted CA protein.

30 In another preferred embodiment, the CA protein to which antibodies are raised is a transmembrane protein. Without being bound by theory, antibodies used for treatment, bind the extracellular domain of the CA protein and prevent it from binding to other proteins, such as circulating ligands or cell-associated molecules. The antibody may cause down-regulation of the transmembrane CA protein. As will be appreciated by one of ordinary skill in the art,

35 the antibody may be a competitive, non-competitive or uncompetitive inhibitor of protein binding to the extracellular domain of the CA protein. The antibody is also an antagonist of the CA protein. Further, the antibody prevents activation of the transmembrane CA protein. In one aspect, when the antibody prevents the binding of other molecules to the CA protein, the antibody prevents growth of the cell. The antibody may also sensitize the cell to cytotoxic

agents, including, but not limited to TNF- α , TNF- β , IL-1, INF- γ and IL-2, or chemotherapeutic agents including 5FU, vinblastine, actinomycin D, cisplatin, methotrexate, and the like. In some instances the antibody belongs to a sub-type that activates serum complement when complexed with the transmembrane protein thereby mediating cytotoxicity. Thus, carcinomas
5 may be treated by administering to a patient antibodies directed against the transmembrane CA protein.

In another preferred embodiment, the antibody is conjugated to a therapeutic moiety. In one aspect the therapeutic moiety is a small molecule that modulates the activity of the CA
10 protein. In another aspect the therapeutic moiety modulates the activity of molecules associated with or in close proximity to the CA protein. The therapeutic moiety may inhibit enzymatic activity such as protease or protein kinase activity associated with carcinoma.

In a preferred embodiment, the therapeutic moiety may also be a cytotoxic agent. In this
15 method, targeting the cytotoxic agent to tumor tissue or cells, results in a reduction in the number of afflicted cells, thereby reducing symptoms associated with carcinomas, including lymphoma. Cytotoxic agents are numerous and varied and include, but are not limited to, cytotoxic drugs or toxins or active fragments of such toxins. Suitable toxins and their corresponding fragments include diphtheria A chain, exotoxin A chain, ricin A chain, abrin A
20 chain, curcin, crotin, phenomycin, enomycin and the like. Cytotoxic agents also include radiochemicals made by conjugating radioisotopes to antibodies raised against CA proteins, or binding of a radionuclide to a chelating agent that has been covalently attached to the antibody. Targeting the therapeutic moiety to transmembrane CA proteins not only serves to increase the local concentration of therapeutic moiety in the carcinoma of interest, i.e.,
25 lymphoma, but also serves to reduce deleterious side effects that may be associated with the therapeutic moiety.

In another preferred embodiment, the CA protein against which the antibodies are raised is an intracellular protein. In this case, the antibody may be conjugated to a protein which
30 facilitates entry into the cell. In one case, the antibody enters the cell by endocytosis. In another embodiment, a nucleic acid encoding the antibody is administered to the individual or cell. Moreover, wherein the CA protein can be targeted within a cell, i.e., the nucleus, an antibody thereto contains a signal for that target localization, i.e., a nuclear localization signal.

35 The CA antibodies of the invention specifically bind to CA proteins. By "specifically bind" herein is meant that the antibodies bind to the protein with a binding constant in the range of at least 10^4 - 10^6 M^{-1} , with a preferred range being 10^7 - 10^9 M^{-1} .

In a preferred embodiment, the CA protein is purified or isolated after expression. CA

proteins may be isolated or purified in a variety of ways known to those skilled in the art depending on what other components are present in the sample. Standard purification methods include electrophoretic, molecular, immunological and chromatographic techniques, including ion exchange, hydrophobic, affinity, and reverse-phase HPLC chromatography, and chromatofocusing. For example, the CA protein may be purified using a standard anti-CA antibody column. Ultrafiltration and diafiltration techniques, in conjunction with protein concentration, are also useful. For general guidance in suitable purification techniques, see Scopes, R., Protein Purification, Springer-Verlag, NY (1982). The degree of purification necessary will vary depending on the use of the CA protein. In some instances no purification will be necessary.

Once expressed and purified if necessary, the CA proteins and nucleic acids are useful in a number of applications.

In one aspect, the expression levels of genes are determined for different cellular states in the carcinoma phenotype; that is, the expression levels of genes in normal tissue and in carcinoma tissue (and in some cases, for varying severities of lymphoma that relate to prognosis, as outlined below) are evaluated to provide expression profiles. An expression profile of a particular cell state or point of development is essentially a "fingerprint" of the state; while two states may have any particular gene similarly expressed, the evaluation of a number of genes simultaneously allows the generation of a gene expression profile that is unique to the state of the cell. By comparing expression profiles of cells in different states, information regarding which genes are important (including both up- and down-regulation of genes) in each of these states is obtained. Then, diagnosis may be done or confirmed: does tissue from a particular patient have the gene expression profile of normal or carcinoma tissue.

"Differential expression," or grammatical equivalents as used herein, refers to both qualitative as well as quantitative differences in the genes temporal and/or cellular expression patterns within and among the cells. Thus, a differentially expressed gene can qualitatively have its expression altered, including an activation or inactivation, in, for example, normal versus carcinoma tissue. That is, genes may be turned on or turned off in a particular state, relative to another state. As is apparent to the skilled artisan, any comparison of two or more states can be made. Such a qualitatively regulated gene will exhibit an expression pattern within a state or cell type which is detectable by standard techniques in one such state or cell type, but is not detectable in both. Alternatively, the determination is quantitative in that expression is increased or decreased; that is, the expression of the gene is either upregulated, resulting in an increased amount of transcript, or downregulated, resulting in a decreased amount of transcript. The degree to which expression differs need only be large enough to quantify via

standard characterization techniques as outlined below, such as by use of Affymetrix GeneChip® expression arrays, Lockhart, Nature Biotechnology, 14:1675-1680 (1996), hereby expressly incorporated by reference. Other techniques include, but are not limited to, quantitative reverse transcriptase PCR, Northern analysis and RNase protection. As outlined
5 above, preferably the change in expression (i.e. upregulation or downregulation) is at least about 50%, more preferably at least about 100%, more preferably at least about 150%, more preferably, at least about 200%, with from 300 to at least 1000% being especially preferred.

As will be appreciated by those in the art, this may be done by evaluation at either the gene
10 transcript, or the protein level; that is, the amount of gene expression may be monitored using nucleic acid probes to the DNA or RNA equivalent of the gene transcript, and the quantification of gene expression levels, or, alternatively, the final gene product itself (protein) can be monitored, for example through the use of antibodies to the CA protein and standard immunoassays (ELISAs, etc.) or other techniques, including mass spectroscopy assays, 2D
15 gel electrophoresis assays, etc. Thus, the proteins corresponding to CA genes, i.e. those identified as being important in a particular carcinoma phenotype, i.e., lymphoma, can be evaluated in a diagnostic test specific for that carcinoma.

In a preferred embodiment, gene expression monitoring is done and a number of genes, i.e.
20 an expression profile, is monitored simultaneously, although multiple protein expression monitoring can be done as well. Similarly, these assays may be done on an individual basis as well.

In this embodiment, the CA nucleic acid probes may be attached to biochips as outlined
25 herein for the detection and quantification of CA sequences in a particular cell. The assays are done as is known in the art. As will be appreciated by those in the art, any number of different CA sequences may be used as probes, with single sequence assays being used in some cases, and a plurality of the sequences described herein being used in other embodiments. In addition, while solid-phase assays are described, any number of solution
30 based assays may be done as well.

In a preferred embodiment, both solid and solution based assays may be used to detect CA sequences that are up-regulated or down-regulated in carcinomas as compared to normal tissue. In instances where the CA sequence has been altered but shows the same
35 expression profile or an altered expression profile, the protein will be detected as outlined herein.

In a preferred embodiment nucleic acids encoding the CA protein are detected. Although DNA or RNA encoding the CA protein may be detected, of particular interest are methods

wherein the mRNA encoding a CA protein is detected. The presence of mRNA in a sample is an indication that the CA gene has been transcribed to form the mRNA, and suggests that the protein is expressed. Probes to detect the mRNA can be any nucleotide/deoxynucleotide probe that is complementary to and base pairs with the mRNA and includes but is not limited to oligonucleotides, cDNA or RNA. Probes also should contain a detectable label, as defined
5 herein. In one method the mRNA is detected after immobilizing the nucleic acid to be examined on a solid support such as nylon membranes and hybridizing the probe with the sample. Following washing to remove the non-specifically bound probe, the label is detected. In another method detection of the mRNA is performed *in situ*. In this method permeabilized
10 cells or tissue samples are contacted with a detectably labeled nucleic acid probe for sufficient time to allow the probe to hybridize with the target mRNA. Following washing to remove the non-specifically bound probe, the label is detected. For example a digoxigenin labeled riboprobe (RNA probe) that is complementary to the mRNA encoding a CA protein is detected by binding the digoxigenin with an anti-digoxigenin secondary antibody and
15 developed with nitro blue tetrazolium and 5_bromo_4_chloro_3_indoyl phosphate.

In a preferred embodiment, any of the three classes of proteins as described herein (secreted, transmembrane or intracellular proteins) are used in diagnostic assays. The CA proteins, antibodies, nucleic acids, modified proteins and cells containing CA sequences are
20 used in diagnostic assays. This can be done on an individual gene or corresponding polypeptide level, or as sets of assays.

As described and defined herein, CA proteins find use as markers of carcinomas, including lymphomas such as, but not limited to, Hodgkin's and non-Hodgkin lymphoma. Detection of
25 these proteins in putative carcinoma tissue or patients allows for a determination or diagnosis of the type of carcinoma. Numerous methods known to those of ordinary skill in the art find use in detecting carcinomas. In one embodiment, antibodies are used to detect CA proteins. A preferred method separates proteins from a sample or patient by electrophoresis on a gel (typically a denaturing and reducing protein gel, but may be any other type of gel including
30 isoelectric focusing gels and the like). Following separation of proteins, the CA protein is detected by immunoblotting with antibodies raised against the CA protein. Methods of immunoblotting are well known to those of ordinary skill in the art.

In another preferred method, antibodies to the CA protein find use in *in situ* imaging
35 techniques. In this method cells are contacted with from one to many antibodies to the CA protein(s). Following washing to remove non-specific antibody binding, the presence of the antibody or antibodies is detected. In one embodiment the antibody is detected by incubating with a secondary antibody that contains a detectable label. In another method the primary antibody to the CA protein(s) contains a detectable label. In another preferred embodiment

each one of multiple primary antibodies contains a distinct and detectable label. This method finds particular use in simultaneous screening for a plurality of CA proteins. As will be appreciated by one of ordinary skill in the art, numerous other histological imaging techniques are useful in the invention.

5

In a preferred embodiment the label is detected in a fluorometer which has the ability to detect and distinguish emissions of different wavelengths. In addition, a fluorescence activated cell sorter (FACS) can be used in the method.

10

In another preferred embodiment, antibodies find use in diagnosing carcinomas from blood samples. As previously described, certain CA proteins are secreted/circulating molecules. Blood samples, therefore, are useful as samples to be probed or tested for the presence of secreted CA proteins. Antibodies can be used to detect the CA proteins by any of the previously described immunoassay techniques including ELISA, immunoblotting (Western blotting), immunoprecipitation, BIACORE technology and the like, as will be appreciated by one of ordinary skill in the art.

15

In a preferred embodiment, *in situ* hybridization of labeled CA nucleic acid probes to tissue arrays is done. For example, arrays of tissue samples, including CA tissue and/or normal tissue, are made. *In situ* hybridization as is known in the art can then be done.

20

It is understood that when comparing the expression fingerprints between an individual and a standard, the skilled artisan can make a diagnosis as well as a prognosis. It is further understood that the genes which indicate the diagnosis may differ from those which indicate the prognosis.

25

In a preferred embodiment, the CA proteins, antibodies, nucleic acids, modified proteins and cells containing CA sequences are used in prognosis assays. As above, gene expression profiles can be generated that correlate to carcinoma, especially lymphoma, severity, in terms of long term prognosis. Again, this may be done on either a protein or gene level, with the use of genes being preferred. As above, the CA probes are attached to biochips for the detection and quantification of CA sequences in a tissue or patient. The assays proceed as outlined for diagnosis.

30

In a preferred embodiment, any of the CA sequences as described herein are used in drug screening assays. The CA proteins, antibodies, nucleic acids, modified proteins and cells containing CA sequences are used in drug screening assays or by evaluating the effect of drug candidates on a "gene expression profile" or expression profile of polypeptides. In one embodiment, the expression profiles are used, preferably in conjunction with high throughput

35

screening techniques to allow monitoring for expression profile genes after treatment with a candidate agent, Zlokarnik, et al., Science 279, 84-8 (1998), Heid, et al., Genome Res., 6:986-994 (1996).

5 In a preferred embodiment, the CA proteins, antibodies, nucleic acids, modified proteins and cells containing the native or modified CA proteins are used in screening assays. That is, the present invention provides novel methods for screening for compositions which modulate the carcinoma phenotype. As above, this can be done by screening for modulators of gene expression or for modulators of protein activity. Similarly, this may be done on an individual
10 gene or protein level or by evaluating the effect of drug candidates on a "gene expression profile". In a preferred embodiment, the expression profiles are used, preferably in conjunction with high throughput screening techniques to allow monitoring for expression profile genes after treatment with a candidate agent, see Zlokarnik, supra.

15 Having identified the CA genes herein, a variety of assays to evaluate the effects of agents on gene expression may be executed. In a preferred embodiment, assays may be run on an individual gene or protein level. That is, having identified a particular gene as aberrantly regulated in carcinoma, candidate bioactive agents may be screened to modulate the genes response. "Modulation" thus includes both an increase and a decrease in gene expression or
20 activity. The preferred amount of modulation will depend on the original change of the gene expression in normal versus tumor tissue, with changes of at least 10%, preferably 50%, more preferably 100-300%, and in some embodiments 300-1000% or greater. Thus, if a gene exhibits a 4 fold increase in tumor compared to normal tissue, a decrease of about four fold is desired; a 10 fold decrease in tumor compared to normal tissue gives a 10 fold
25 increase in expression for a candidate agent is desired, etc. Alternatively, where the CA sequence has been altered but shows the same expression profile or an altered expression profile, the protein will be detected as outlined herein.

30 As will be appreciated by those in the art, this may be done by evaluation at either the gene or the protein level; that is, the amount of gene expression may be monitored using nucleic acid probes and the quantification of gene expression levels, or, alternatively, the level of the gene product itself can be monitored, for example through the use of antibodies to the CA protein and standard immunoassays. Alternatively, binding and bioactivity assays with the protein may be done as outlined below.

35 In a preferred embodiment, gene expression monitoring is done and a number of genes, i.e. an expression profile, is monitored simultaneously, although multiple protein expression monitoring can be done as well.

In this embodiment, the CA nucleic acid probes are attached to biochips as outlined herein for the detection and quantification of CA sequences in a particular cell. The assays are further described below.

5 Generally, in a preferred embodiment, a candidate bioactive agent is added to the cells prior to analysis. Moreover, screens are provided to identify a candidate bioactive agent which modulates a particular type of carcinoma, modulates CA proteins, binds to a CA protein, or interferes between the binding of a CA protein and an antibody.

10 The term "candidate bioactive agent" or "drug candidate" or grammatical equivalents as used herein describes any molecule, e.g., protein, oligopeptide, small organic or inorganic molecule, polysaccharide, polynucleotide, etc., to be tested for bioactive agents that are capable of directly or indirectly altering either the carcinoma phenotype, binding to and/or modulating the bioactivity of an CA protein, or the expression of a CA sequence, including
15 both nucleic acid sequences and protein sequences. In a particularly preferred embodiment, the candidate agent suppresses a CA phenotype, for example to a normal tissue fingerprint. Similarly, the candidate agent preferably suppresses a severe CA phenotype. Generally a plurality of assay mixtures are run in parallel with different agent concentrations to obtain a differential response to the various concentrations. Typically, one of these concentrations
20 serves as a negative control, i.e., at zero concentration or below the level of detection.

In one aspect, a candidate agent will neutralize the effect of an CA protein. By "neutralize" is meant that activity of a protein is either inhibited or counter acted against so as to have substantially no effect on a cell.

25 Candidate agents encompass numerous chemical classes, though typically they are organic or inorganic molecules, preferably small organic compounds having a molecular weight of more than 100 and less than about 2,500 daltons. Preferred small molecules are less than 2000, or less than 1500 or less than 1000 or less than 500 D. Candidate agents comprise
30 functional groups necessary for structural interaction with proteins, particularly hydrogen bonding, and typically include at least an amine, carbonyl, hydroxyl or carboxyl group, preferably at least two of the functional chemical groups. The candidate agents often comprise cyclical carbon or heterocyclic structures and/or aromatic or polyaromatic structures substituted with one or more of the above functional groups. Candidate agents are also found
35 among biomolecules including peptides, saccharides, fatty acids, steroids, purines, pyrimidines, derivatives, structural analogs or combinations thereof. Particularly preferred are peptides.

Candidate agents are obtained from a wide variety of sources including libraries of synthetic

or natural compounds. For example, numerous means are available for random and directed synthesis of a wide variety of organic compounds and biomolecules, including expression of randomized oligonucleotides. Alternatively, libraries of natural compounds in the form of bacterial, fungal, plant and animal extracts are available or readily produced. Additionally,
5 natural or synthetically produced libraries and compounds are readily modified through conventional chemical, physical and biochemical means. Known pharmacological agents may be subjected to directed or random chemical modifications, such as acylation, alkylation, esterification, amidification to produce structural analogs.

10 In a preferred embodiment, the candidate bioactive agents are proteins. By "protein" herein is meant at least two covalently attached amino acids, which includes proteins, polypeptides, oligopeptides and peptides. The protein may be made up of naturally occurring amino acids and peptide bonds, or synthetic peptidomimetic structures. Thus "amino acid", or "peptide residue", as used herein means both naturally occurring and synthetic amino acids. For
15 example, homo-phenylalanine, citrulline and noreleucine are considered amino acids for the purposes of the invention. "Amino acid" also includes imino acid residues such as proline and hydroxyproline. The side chains may be in either the (R) or the (S) configuration. In the preferred embodiment, the amino acids are in the (S) or L-configuration. If non-naturally occurring side chains are used, non-amino acid substituents may be used, for example to
20 prevent or retard in vivo degradations.

In a preferred embodiment, the candidate bioactive agents are naturally occurring proteins or fragments of naturally occurring proteins. Thus, for example, cellular extracts containing proteins, or random or directed digests of proteinaceous cellular extracts, may be used. In this way libraries of procaryotic and eucaryotic proteins may be made for screening in the
25 methods of the invention. Particularly preferred in this embodiment are libraries of bacterial, fungal, viral, and mammalian proteins, with the latter being preferred, and human proteins being especially preferred.

30 In a preferred embodiment, the candidate bioactive agents are peptides of from about 5 to about 30 amino acids, with from about 5 to about 20 amino acids being preferred, and from about 7 to about 15 being particularly preferred. The peptides may be digests of naturally occurring proteins as is outlined above, random peptides, or "biased" random peptides. By "randomized" or grammatical equivalents herein is meant that each nucleic acid and peptide consists of essentially random nucleotides and amino acids, respectively. Since generally
35 these random peptides (or nucleic acids, discussed below) are chemically synthesized, they may incorporate any nucleotide or amino acid at any position. The synthetic process can be designed to generate randomized proteins or nucleic acids, to allow the formation of all or most of the possible combinations over the length of the sequence, thus forming a library of randomized candidate bioactive proteinaceous agents.

In one embodiment, the library is fully randomized, with no sequence preferences or constants at any position. In a preferred embodiment, the library is biased. That is, some positions within the sequence are either held constant, or are selected from a limited number of possibilities. For example, in a preferred embodiment, the nucleotides or amino acid residues are randomized within a defined class, for example, of hydrophobic amino acids, hydrophilic residues, sterically biased (either small or large) residues, towards the creation of nucleic acid binding domains, the creation of cysteines, for cross-linking, prolines for SH-3 domains, serines, threonines, tyrosines or histidines for phosphorylation sites, etc., or to purines, etc.

In a preferred embodiment, the candidate bioactive agents are nucleic acids, as defined above.

As described above generally for proteins, nucleic acid candidate bioactive agents may be naturally occurring nucleic acids, random nucleic acids, or "biased" random nucleic acids. For example, digests of procaryotic or eucaryotic genomes may be used as is outlined above for proteins.

In a preferred embodiment, the candidate bioactive agents are organic chemical moieties, a wide variety of which are available in the literature.

In assays for altering the expression profile of one or more CA genes, after the candidate agent has been added and the cells allowed to incubate for some period of time, the sample containing the target sequences to be analyzed is added to the biochip. If required, the target sequence is prepared using known techniques. For example, the sample may be treated to lyse the cells, using known lysis buffers, electroporation, etc., with purification and/or amplification such as PCR occurring as needed, as will be appreciated by those in the art. For example, an *in vitro* transcription with labels covalently attached to the nucleosides is done. Generally, the nucleic acids are labeled with a label as defined herein, with biotin-FITC or PE, cy3 and cy5 being particularly preferred.

In a preferred embodiment, the target sequence is labeled with, for example, a fluorescent, chemiluminescent, chemical, or radioactive signal, to provide a means of detecting the target sequence's specific binding to a probe. The label also can be an enzyme, such as, alkaline phosphatase or horseradish peroxidase, which when provided with an appropriate substrate produces a product that can be detected. Alternatively, the label can be a labeled compound or small molecule, such as an enzyme inhibitor, that binds but is not catalyzed or altered by the enzyme. The label also can be a moiety or compound, such as, an epitope tag or biotin

which specifically binds to streptavidin. For the example of biotin, the streptavidin is labeled as described above, thereby, providing a detectable signal for the bound target sequence. As known in the art, unbound labeled streptavidin is removed prior to analysis.

5 As will be appreciated by those in the art, these assays can be direct hybridization assays or can comprise "sandwich assays", which include the use of multiple probes, as is generally outlined in U.S. Patent Nos. 5,681,702, 5,597,909, 5,545,730, 5,594,117, 5,591,584, 5,571,670, 5,580,731, 5,571,670, 5,591,584, 5,624,802, 5,635,352, 5,594,118, 5,359,100, 5,124,246 and 5,681,697, all of which are hereby incorporated by reference. In this
10 embodiment, in general, the target nucleic acid is prepared as outlined above, and then added to the biochip comprising a plurality of nucleic acid probes, under conditions that allow the formation of a hybridization complex.

A variety of hybridization conditions may be used in the present invention, including high,
15 moderate and low stringency conditions as outlined above. The assays are generally run under stringency conditions which allows formation of the label probe hybridization complex only in the presence of target. Stringency can be controlled by altering a step parameter that is a thermodynamic variable, including, but not limited to, temperature, formamide concentration, salt concentration, chaotropic salt concentration pH, organic solvent
20 concentration, etc.

These parameters may also be used to control non-specific binding, as is generally outlined in U.S. Patent No. 5,681,697. Thus it may be desirable to perform certain steps at higher stringency conditions to reduce non-specific binding.

25 The reactions outlined herein may be accomplished in a variety of ways, as will be appreciated by those in the art. Components of the reaction may be added simultaneously, or sequentially, in any order, with preferred embodiments outlined below. In addition, the reaction may include a variety of other reagents may be included in the assays. These
30 include reagents like salts, buffers, neutral proteins, e.g. albumin, detergents, etc which may be used to facilitate optimal hybridization and detection, and/or reduce non-specific or background interactions. Also reagents that otherwise improve the efficiency of the assay, such as protease inhibitors, nuclease inhibitors, anti-microbial agents, etc., may be used, depending on the sample preparation methods and purity of the target. In addition, either
35 solid phase or solution based (i.e., kinetic PCR) assays may be used.

Once the assay is run, the data is analyzed to determine the expression levels, and changes in expression levels as between states, of individual genes, forming a gene expression profile.

In a preferred embodiment, as for the diagnosis and prognosis applications, having identified the differentially expressed gene(s) or mutated gene(s) important in any one state, screens can be run to alter the expression of the genes individually. That is, screening for modulation of regulation of expression of a single gene can be done. Thus, for example, particularly in
5 the case of target genes whose presence or absence is unique between two states, screening is done for modulators of the target gene expression.

In addition, screens can be done for novel genes that are induced in response to a candidate agent. After identifying a candidate agent based upon its ability to suppress a CA expression
10 pattern leading to a normal expression pattern, or modulate a single CA gene expression profile so as to mimic the expression of the gene from normal tissue, a screen as described above can be performed to identify genes that are specifically modulated in response to the agent. Comparing expression profiles between normal tissue and agent treated CA tissue reveals genes that are not expressed in normal tissue or CA tissue, but are expressed in
15 agent treated tissue. These agent specific sequences can be identified and used by any of the methods described herein for CA genes or proteins. In particular these sequences and the proteins they encode find use in marking or identifying agent treated cells. In addition, antibodies can be raised against the agent induced proteins and used to target novel therapeutics to the treated CA tissue sample.

20 Thus, in one embodiment, a candidate agent is administered to a population of CA cells, that thus has an associated CA expression profile. By "administration" or "contacting" herein is meant that the candidate agent is added to the cells in such a manner as to allow the agent to act upon the cell, whether by uptake and intracellular action, or by action at the cell surface.
25 In some embodiments, nucleic acid encoding a proteinaceous candidate agent (i.e. a peptide) may be put into a viral construct such as a retroviral construct and added to the cell, such that expression of the peptide agent is accomplished; see PCT US97/01019, hereby expressly incorporated by reference.

30 Once the candidate agent has been administered to the cells, the cells can be washed if desired and are allowed to incubate under preferably physiological conditions for some period of time. The cells are then harvested and a new gene expression profile is generated, as outlined herein.

35 Thus, for example, CA tissue may be screened for agents that reduce or suppress the CA phenotype. A change in at least one gene of the expression profile indicates that the agent has an effect on CA activity. By defining such a signature for the CA phenotype, screens for new drugs that alter the phenotype can be devised. With this approach, the drug target need not be known and need not be represented in the original expression screening platform, nor

does the level of transcript for the target protein need to change.

In a preferred embodiment, as outlined above, screens may be done on individual genes and gene products (proteins). That is, having identified a particular differentially expressed gene
5 as important in a particular state, screening of modulators of either the expression of the gene or the gene product itself can be done. The gene products of differentially expressed genes are sometimes referred to herein as "CA proteins" or an "CAP". The CAP may be a fragment, or alternatively, be the full length protein to the fragment encoded by the nucleic acids of Tables 1-112. Preferably, the CAP is a fragment. In another embodiment, the
10 sequences are sequence variants as further described herein.

Preferably, the CAP is a fragment of approximately 14 to 24 amino acids long. More preferably the fragment is a soluble fragment. Preferably, the fragment includes a non-transmembrane region. In a preferred embodiment, the fragment has an N-terminal Cys to
15 aid in solubility. In one embodiment, the c-terminus of the fragment is kept as a free acid and the n-terminus is a free amine to aid in coupling, i.e., to cysteine.

In one embodiment the CA proteins are conjugated to an immunogenic agent as discussed herein. In one embodiment the CA protein is conjugated to BSA.
20

In a preferred embodiment, screening is done to alter the biological function of the expression product of the CA gene. Again, having identified the importance of a gene in a particular state, screening for agents that bind and/or modulate the biological activity of the gene product can be run as is more fully outlined below.
25

In a preferred embodiment, screens are designed to first find candidate agents that can bind to CA proteins, and then these agents may be used in assays that evaluate the ability of the candidate agent to modulate the CAP activity and the carcinoma phenotype. Thus, as will be appreciated by those in the art, there are a number of different assays which may be run;
30 binding assays and activity assays.

In a preferred embodiment, binding assays are done. In general, purified or isolated gene product is used; that is, the gene products of one or more CA nucleic acids are made. In general, this is done as is known in the art. For example, antibodies are generated to the
35 protein gene products, and standard immunoassays are run to determine the amount of protein present. Alternatively, cells comprising the CA proteins can be used in the assays.

Thus, in a preferred embodiment, the methods comprise combining a CA protein and a candidate bioactive agent, and determining the binding of the candidate agent to the CA

protein. Preferred embodiments utilize the human or mouse CA protein, although other mammalian proteins may also be used, for example for the development of animal models of human disease. In some embodiments, as outlined herein, variant or derivative CA proteins may be used.

5

Generally, in a preferred embodiment of the methods herein, the CA protein or the candidate agent is non-diffusably bound to an insoluble support having isolated sample receiving areas (e.g. a microtiter plate, an array, etc.). The insoluble supports may be made of any composition to which the compositions can be bound, is readily separated from soluble material, and is otherwise compatible with the overall method of screening. The surface of such supports may be solid or porous and of any convenient shape. Examples of suitable insoluble supports include microtiter plates, arrays, membranes and beads. These are typically made of glass, plastic (e.g., polystyrene), polysaccharides, nylon or nitrocellulose, Teflon™, etc. Microtiter plates and arrays are especially convenient because a large number of assays can be carried out simultaneously, using small amounts of reagents and samples. The particular manner of binding of the composition is not crucial so long as it is compatible with the reagents and overall methods of the invention, maintains the activity of the composition and is nondiffusable. Preferred methods of binding include the use of antibodies (which do not sterically block either the ligand binding site or activation sequence when the protein is bound to the support), direct binding to "sticky" or ionic supports, chemical crosslinking, the synthesis of the protein or agent on the surface, etc. Following binding of the protein or agent, excess unbound material is removed by washing. The sample receiving areas may then be blocked through incubation with bovine serum albumin (BSA), casein or other innocuous protein or other moiety.

25

In a preferred embodiment, the CA protein is bound to the support, and a candidate bioactive agent is added to the assay. Alternatively, the candidate agent is bound to the support and the CA protein is added. Novel binding agents include specific antibodies, non_natural binding agents identified in screens of chemical libraries, peptide analogs, etc. Of particular interest are screening assays for agents that have a low toxicity for human cells. A wide variety of assays may be used for this purpose, including labeled *in vitro* protein_protein binding assays, electrophoretic mobility shift assays, immunoassays for protein binding, functional assays (phosphorylation assays, etc.) and the like.

30

The determination of the binding of the candidate bioactive agent to the CA protein may be done in a number of ways. In a preferred embodiment, the candidate bioactive agent is labeled, and binding determined directly. For example, this may be done by attaching all or a portion of the CA protein to a solid support, adding a labeled candidate agent (for example a fluorescent label), washing off excess reagent, and determining whether the label is present

35

on the solid support. Various blocking and washing steps may be utilized as is known in the art.

By "labeled" herein is meant that the compound is either directly or indirectly labeled with a label which provides a detectable signal, e.g. radioisotope, fluorescers, enzyme, antibodies, particles such as magnetic particles, chemilumescers, or specific binding molecules, etc. Specific binding molecules include pairs, such as biotin and streptavidin, digoxin and antidigoxin etc. For the specific binding members, the complementary member would normally be labeled with a molecule which provides for detection, in accordance with known procedures, as outlined above. The label can directly or indirectly provide a detectable signal.

In some embodiments, only one of the components is labeled. For example, the proteins (or proteinaceous candidate agents) may be labeled at tyrosine positions using ^{125}I , or with fluorophores. Alternatively, more than one component may be labeled with different labels; using ^{125}I for the proteins, for example, and a fluorophor for the candidate agents.

In a preferred embodiment, the binding of the candidate bioactive agent is determined through the use of competitive binding assays. In this embodiment, the competitor is a binding moiety known to bind to the target molecule (i.e. CA protein), such as an antibody, peptide, binding partner, ligand, etc. Under certain circumstances, there may be competitive binding as between the bioactive agent and the binding moiety, with the binding moiety displacing the bioactive agent.

In one embodiment, the candidate bioactive agent is labeled. Either the candidate bioactive agent, or the competitor, or both, is added first to the protein for a time sufficient to allow binding, if present. Incubations may be performed at any temperature which facilitates optimal activity, typically between 4 and 40°C. Incubation periods are selected for optimum activity, but may also be optimized to facilitate rapid high through put screening. Typically between 0.1 and 1 hour will be sufficient. Excess reagent is generally removed or washed away. The second component is then added, and the presence or absence of the labeled component is followed, to indicate binding.

In a preferred embodiment, the competitor is added first, followed by the candidate bioactive agent. Displacement of the competitor is an indication that the candidate bioactive agent is binding to the CA protein and thus is capable of binding to, and potentially modulating, the activity of the CA protein. In this embodiment, either component can be labeled. Thus, for example, if the competitor is labeled, the presence of label in the wash solution indicates displacement by the agent. Alternatively, if the candidate bioactive agent is labeled, the presence of the label on the support indicates displacement.

In an alternative embodiment, the candidate bioactive agent is added first, with incubation and washing, followed by the competitor. The absence of binding by the competitor may indicate that the bioactive agent is bound to the CA protein with a higher affinity. Thus, if the
5 candidate bioactive agent is labeled, the presence of the label on the support, coupled with a lack of competitor binding, may indicate that the candidate agent is capable of binding to the CA protein.

In a preferred embodiment, the methods comprise differential screening to identify bioactive
10 agents that are capable of modulating the activity of the CA proteins. In this embodiment, the methods comprise combining a CA protein and a competitor in a first sample. A second sample comprises a candidate bioactive agent, a CA protein and a competitor. The binding of the competitor is determined for both samples, and a change, or difference in binding
15 between the two samples indicates the presence of an agent capable of binding to the CA protein and potentially modulating its activity. That is, if the binding of the competitor is different in the second sample relative to the first sample, the agent is capable of binding to the CA protein.

Alternatively, a preferred embodiment utilizes differential screening to identify drug candidates
20 that bind to the native CA protein, but cannot bind to modified CA proteins. The structure of the CA protein may be modeled, and used in rational drug design to synthesize agents that interact with that site. Drug candidates that affect CA bioactivity are also identified by screening drugs for the ability to either enhance or reduce the activity of the protein.

25 Positive controls and negative controls may be used in the assays. Preferably all control and test samples are performed in at least triplicate to obtain statistically significant results. Incubation of all samples is for a time sufficient for the binding of the agent to the protein. Following incubation, all samples are washed free of non_specifically bound material and the amount of bound, generally labeled agent determined. For example, where a radiolabel is
30 employed, the samples may be counted in a scintillation counter to determine the amount of bound compound.

A variety of other reagents may be included in the screening assays. These include reagents
35 like salts, neutral proteins, e.g. albumin, detergents, etc which may be used to facilitate optimal protein_protein binding and/or reduce non_specific or background interactions. Also reagents that otherwise improve the efficiency of the assay, such as protease inhibitors, nuclease inhibitors, anti_microbial agents, etc., may be used. The mixture of components may be added in any order that provides for the requisite binding.

Screening for agents that modulate the activity of CA proteins may also be done. In a preferred embodiment, methods for screening for a bioactive agent capable of modulating the activity of CA proteins comprise the steps of adding a candidate bioactive agent to a sample of CA proteins, as above, and determining an alteration in the biological activity of CA proteins. "Modulating the activity of an CA protein" includes an increase in activity, a decrease in activity, or a change in the type or kind of activity present. Thus, in this embodiment, the candidate agent should both bind to CA proteins (although this may not be necessary), and alter its biological or biochemical activity as defined herein. The methods include both *in vitro* screening methods, as are generally outlined above, and *in vivo* screening of cells for alterations in the presence, distribution, activity or amount of CA proteins.

Thus, in this embodiment, the methods comprise combining a CA sample and a candidate bioactive agent, and evaluating the effect on CA activity. By "CA activity" or grammatical equivalents herein is meant one of the CA protein's biological activities, including, but not limited to, its role in tumorigenesis, including cell division, preferably in lymphatic tissue, cell proliferation, tumor growth and transformation of cells. In one embodiment, CA activity includes activation of or by a protein encoded by a nucleic acid of Tables 1-112. An inhibitor of CA activity is the inhibition of any one or more CA activities.

In a preferred embodiment, the activity of the CA protein is increased; in another preferred embodiment, the activity of the CA protein is decreased. Thus, bioactive agents that are antagonists are preferred in some embodiments, and bioactive agents that are agonists may be preferred in other embodiments.

In a preferred embodiment, the invention provides methods for screening for bioactive agents capable of modulating the activity of a CA protein. The methods comprise adding a candidate bioactive agent, as defined above, to a cell comprising CA proteins. Preferred cell types include almost any cell. The cells contain a recombinant nucleic acid that encodes a CA protein. In a preferred embodiment, a library of candidate agents are tested on a plurality of cells.

In one aspect, the assays are evaluated in the presence or absence or previous or subsequent exposure of physiological signals, for example hormones, antibodies, peptides, antigens, cytokines, growth factors, action potentials, pharmacological agents including chemotherapeutics, radiation, carcinogenics, or other cells (i.e. cell-cell contacts). In another example, the determinations are determined at different stages of the cell cycle process.

In this way, bioactive agents are identified. Compounds with pharmacological activity are

able to enhance or interfere with the activity of the CA protein.

In one embodiment, a method of inhibiting carcinoma cancer cell division, is provided. The method comprises administration of a carcinoma cancer inhibitor.

5

In a preferred embodiment, a method of inhibiting lymphoma carcinoma cell division is provided comprising administration of a lymphoma carcinoma inhibitor.

10 In another embodiment, a method of inhibiting tumor growth is provided. The method comprises administration of a carcinoma cancer inhibitor. In a particularly preferred embodiment, a method of inhibiting tumor growth in lymphatic tissue is provided comprising administration of a lymphoma inhibitor.

15 In a further embodiment, methods of treating cells or individuals with cancer are provided. The method comprises administration of a carcinoma cancer inhibitor. Preferably, the carcinoma is a lymphoma carcinoma.

20 In one embodiment, a carcinoma cancer inhibitor is an antibody as discussed above. In another embodiment, the carcinoma cancer inhibitor is an antisense molecule. Antisense molecules as used herein include antisense or sense oligonucleotides comprising a single-stranded nucleic acid sequence (either RNA or DNA) capable of binding to target mRNA (sense) or DNA (antisense) sequences for carcinoma cancer molecules. Antisense or sense oligonucleotides, according to the present invention, comprise a fragment generally at least about 14 nucleotides, preferably from about 14 to 30 nucleotides. The ability to derive an antisense or a sense oligonucleotide, based upon a cDNA sequence encoding a given protein is described in, for example, Stein and Cohen, Cancer Res. 48:2659, (1988) and van der Krol et al., BioTechniques 6:958, (1988).

25 Antisense molecules may be introduced into a cell containing the target nucleotide sequence by formation of a conjugate with a ligand binding molecule, as described in WO 91/04753. Suitable ligand binding molecules include, but are not limited to, cell surface receptors, growth factors, other cytokines, or other ligands that bind to cell surface receptors. Preferably, conjugation of the ligand binding molecule does not substantially interfere with the ability of the ligand binding molecule to bind to its corresponding molecule or receptor, or block entry of the sense or antisense oligonucleotide or its conjugated version into the cell. Alternatively, a sense or an antisense oligonucleotide may be introduced into a cell containing the target nucleic acid sequence by formation of an oligonucleotide-lipid complex, as described in WO 90/10448. It is understood that the use of antisense molecules or knock out and knock in models may also be used in screening assays as discussed above, in addition to methods of treatment.

The compounds having the desired pharmacological activity may be administered in a physiologically acceptable carrier to a host, as previously described. The agents may be administered in a variety of ways, orally, parenterally e.g., subcutaneously, intraperitoneally, intravascularly, etc. Depending upon the manner of introduction, the compounds may be formulated in a variety of ways. The concentration of therapeutically active compound in the formulation may vary from about 0.1_100% wgt/vol. The agents may be administered alone or in combination with other treatments, i.e., radiation.

The pharmaceutical compositions can be prepared in various forms, such as granules, tablets, pills, suppositories, capsules, suspensions, salves, lotions and the like. Pharmaceutical grade organic or inorganic carriers and/or diluents suitable for oral and topical use can be used to make up compositions containing the therapeutically active compounds. Diluents known to the art include aqueous media, vegetable and animal oils and fats. Stabilizing agents, wetting and emulsifying agents, salts for varying the osmotic pressure or buffers for securing an adequate pH value, and skin penetration enhancers can be used as auxiliary agents.

Without being bound by theory, it appears that the various CA sequences are important in carcinomas. Accordingly, disorders based on mutant or variant CA genes may be determined. In one embodiment, the invention provides methods for identifying cells containing variant CA genes comprising determining all or part of the sequence of at least one endogenous CA genes in a cell. As will be appreciated by those in the art, this may be done using any number of sequencing techniques. In a preferred embodiment, the invention provides methods of identifying the CA genotype of an individual comprising determining all or part of the sequence of at least one CA gene of the individual. This is generally done in at least one tissue of the individual, and may include the evaluation of a number of tissues or different samples of the same tissue. The method may include comparing the sequence of the sequenced CA gene to a known CA gene, i.e., a wild-type gene. As will be appreciated by those in the art, alterations in the sequence of some oncogenes can be an indication of either the presence of the disease, or propensity to develop the disease, or prognosis evaluations.

The sequence of all or part of the CA gene can then be compared to the sequence of a known CA gene to determine if any differences exist. This can be done using any number of known homology programs, such as Bestfit, etc. In a preferred embodiment, the presence of a difference in the sequence between the CA gene of the patient and the known CA gene is indicative of a disease state or a propensity for a disease state, as outlined herein.

In a preferred embodiment, the CA genes are used as probes to determine the number of copies of the CA gene in the genome. For example, some cancers exhibit chromosomal deletions or insertions, resulting in an alteration in the copy number of a gene.

5 In another preferred embodiment CA genes are used as probes to determine the chromosomal location of the CA genes. Information such as chromosomal location finds use in providing a diagnosis or prognosis in particular when chromosomal abnormalities such as translocations, and the like are identified in CA gene loci.

10 Thus, in one embodiment, methods of modulating CA in cells or organisms are provided. In one embodiment, the methods comprise administering to a cell an anti-CA antibody that reduces or eliminates the biological activity of an endogenous CA protein. Alternatively, the methods comprise administering to a cell or organism a recombinant nucleic acid encoding a CA protein. As will be appreciated by those in the art, this may be accomplished in any
15 number of ways. In a preferred embodiment, for example when the CA sequence is down-regulated in carcinoma, the activity of the CA gene is increased by increasing the amount of CA in the cell, for example by overexpressing the endogenous CA or by administering a gene encoding the CA sequence, using known gene-therapy techniques, for example. In a preferred embodiment, the gene therapy techniques include the incorporation of the
20 exogenous gene using enhanced homologous recombination (EHR), for example as described in PCT/US93/03868, hereby incorporated by reference in its entirety. Alternatively, for example when the CA sequence is up-regulated in carcinoma, the activity of the endogenous CA gene is decreased, for example by the administration of a CA antisense nucleic acid.

25 In one embodiment, the CA proteins of the present invention may be used to generate polyclonal and monoclonal antibodies to CA proteins, which are useful as described herein. Similarly, the CA proteins can be coupled, using standard technology, to affinity chromatography columns. These columns may then be used to purify CA antibodies. In a preferred embodiment, the antibodies are generated to epitopes unique to a CA protein; that is, the antibodies show little or no cross-reactivity to other proteins. These antibodies find use in a number of applications. For example, the CA antibodies may be coupled to standard
30 affinity chromatography columns and used to purify CA proteins. The antibodies may also be used as blocking polypeptides, as outlined above, since they will specifically bind to the CA
35 protein.

In one embodiment, a therapeutically effective dose of a CA or modulator thereof is administered to a patient. By "therapeutically effective dose" herein is meant a dose that produces the effects for which it is administered. The exact dose will depend on the purpose

of the treatment, and will be ascertainable by one skilled in the art using known techniques. As is known in the art, adjustments for CA degradation, systemic versus localized delivery, and rate of new protease synthesis, as well as the age, body weight, general health, sex, diet, time of administration, drug interaction and the severity of the condition may be necessary, and will be ascertainable with routine experimentation by those skilled in the art.

A "patient" for the purposes of the present invention includes both humans and other animals, particularly mammals, and organisms. Thus the methods are applicable to both human therapy and veterinary applications. In the preferred embodiment the patient is a mammal, and in the most preferred embodiment the patient is human.

The administration of the CA proteins and modulators of the present invention can be done in a variety of ways as discussed above, including, but not limited to, orally, subcutaneously, intravenously, intranasally, transdermally, intraperitoneally, intramuscularly, intrapulmonary, vaginally, rectally, or intraocularly. In some instances, for example, in the treatment of wounds and inflammation, the CA proteins and modulators may be directly applied as a solution or spray.

The pharmaceutical compositions of the present invention comprise a CA protein in a form suitable for administration to a patient. In the preferred embodiment, the pharmaceutical compositions are in a water soluble form, such as being present as pharmaceutically acceptable salts, which is meant to include both acid and base addition salts.

"Pharmaceutically acceptable acid addition salt" refers to those salts that retain the biological effectiveness of the free bases and that are not biologically or otherwise undesirable, formed with inorganic acids such as hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, phosphoric acid and the like, and organic acids such as acetic acid, propionic acid, glycolic acid, pyruvic acid, oxalic acid, maleic acid, malonic acid, succinic acid, fumaric acid, tartaric acid, citric acid, benzoic acid, cinnamic acid, mandelic acid, methanesulfonic acid, ethanesulfonic acid, p_toluenesulfonic acid, salicylic acid and the like. "Pharmaceutically acceptable base addition salts" include those derived from inorganic bases such as sodium, potassium, lithium, ammonium, calcium, magnesium, iron, zinc, copper, manganese, aluminum salts and the like. Particularly preferred are the ammonium, potassium, sodium, calcium, and magnesium salts. Salts derived from pharmaceutically acceptable organic non_toxic bases include salts of primary, secondary, and tertiary amines, substituted amines including naturally occurring substituted amines, cyclic amines and basic ion exchange resins, such as isopropylamine, trimethylamine, diethylamine, triethylamine, tripropylamine, and ethanolamine.

The pharmaceutical compositions may also include one or more of the following: carrier

proteins such as serum albumin; buffers; fillers such as microcrystalline cellulose, lactose, corn and other starches; binding agents; sweeteners and other flavoring agents; coloring agents; and polyethylene glycol. Additives are well known in the art, and are used in a variety of formulations.

5 In a preferred embodiment, CA proteins and modulators are administered as therapeutic agents, and can be formulated as outlined above. Similarly, CA genes (including both the full-length sequence, partial sequences, or regulatory sequences of the CA coding regions) can be administered in gene therapy applications, as is known in the art. These CA genes can include antisense applications, either as gene therapy (i.e. for incorporation into the genome)
10 or as antisense compositions, as will be appreciated by those in the art.

In a preferred embodiment, CA genes are administered as DNA vaccines, either single genes or combinations of CA genes. Naked DNA vaccines are generally known in the art. Brower, Nature Biotechnology, 16:1304-1305 (1998).

15 In one embodiment, CA genes of the present invention are used as DNA vaccines. Methods for the use of genes as DNA vaccines are well known to one of ordinary skill in the art, and include placing a CA gene or portion of a CA gene under the control of a promoter for expression in a patient with carcinoma. The CA gene used for DNA vaccines can encode full-length CA proteins, but more preferably encodes portions of the CA proteins including
20 peptides derived from the CA protein. In a preferred embodiment a patient is immunized with a DNA vaccine comprising a plurality of nucleotide sequences derived from a CA gene. Similarly, it is possible to immunize a patient with a plurality of CA genes or portions thereof as defined herein. Without being bound by theory, expression of the polypeptide encoded by
25 the DNA vaccine, cytotoxic T-cells, helper T-cells and antibodies are induced which recognize and destroy or eliminate cells expressing CA proteins.

In a preferred embodiment, the DNA vaccines include a gene encoding an adjuvant molecule with the DNA vaccine. Such adjuvant molecules include cytokines that increase the
30 immunogenic response to the CA polypeptide encoded by the DNA vaccine. Additional or alternative adjuvants are known to those of ordinary skill in the art and find use in the invention.

In another preferred embodiment CA genes find use in generating animal models of
35 carcinomas, particularly lymphoma carcinomas. As is appreciated by one of ordinary skill in the art, when the CA gene identified is repressed or diminished in CA tissue, gene therapy technology wherein antisense RNA directed to the CA gene will also diminish or repress expression of the gene. An animal generated as such serves as an animal model of CA that finds use in screening bioactive drug candidates. Similarly, gene knockout technology, for

example as a result of homologous recombination with an appropriate gene targeting vector, will result in the absence of the CA protein. When desired, tissue-specific expression or knockout of the CA protein may be necessary.

- 5 It is also possible that the CA protein is overexpressed in carcinoma. As such, transgenic animals can be generated that overexpress the CA protein. Depending on the desired expression level, promoters of various strengths can be employed to express the transgene. Also, the number of copies of the integrated transgene can be determined and compared for a determination of the expression level of the transgene. Animals generated by such methods find use as animal models of CA and are additionally useful in screening for bioactive molecules to treat carcinoma.

- 15 The CA nucleic acid sequences of the invention are depicted in Tables 1-112. The sequences in Tables 1 and 2 depict mouse tags, i.e. the genomic insertion sites. The sequences in Tables 3-102 include genomic sequence, mRNA and coding sequences for both mouse and human. N/A indicates a gene that has been identified, but for which there has not been a name ascribed. The different sequences are assigned the following SEQ ID Nos:

20 Table 3 (mouse gene: Fscn1; human gene SNL)

Mouse genomic sequence (SEQ ID NO: 1)

Mouse mRNA sequence (SEQ ID NO: 2)

Mouse coding sequence (SEQ ID NO: 3)

Human genomic sequence (SEQ ID NO: 4)

25 Human mRNA sequence (SEQ ID NO: 5)

Human coding sequence (SEQ ID NO: 6)

Table 4 (mouse gene Map3k6; human gene MAP3K6)

Mouse genomic sequence (SEQ ID NO: 7)

30 Mouse mRNA sequence (SEQ ID NO: 8)

Mouse coding sequence (SEQ ID NO: 9)

Human genomic sequence (SEQ ID NO: 10)

Human mRNA sequence (SEQ ID NO: 11)

Human coding sequence (SEQ ID NO: 12)

35

Table 5 (mouse gene Fosb; human gene FOSB)

Mouse genomic sequence (SEQ ID NO: 13)

Mouse mRNA sequence (SEQ ID NO: 14)

Mouse coding sequence (SEQ ID NO: 15)

Human genomic sequence (SEQ ID NO: 16)

Human mRNA sequence (SEQ ID NO: 17)

Human coding sequence (SEQ ID NO: 18)

5 Table 6 (mouse gene cmkbr7; human gene: CCR7)

Mouse genomic sequence (SEQ ID NO: 19)

Mouse mRNA sequence (SEQ ID NO: 20)

Mouse coding sequence (SEQ ID NO: 21)

Human genomic sequence (SEQ ID NO: 22)

10 Human mRNA sequence (SEQ ID NO: 23)

Human coding sequence (SEQ ID NO: 24)

Table 7 (mouse gene: Ccnd1; human gene: CCND1)

Mouse genomic sequence (SEQ ID NO: 25)

15 Mouse mRNA sequence (SEQ ID NO: 26)

Mouse coding sequence (SEQ ID NO: 27)

Human genomic sequence (SEQ ID NO: 28)

Human mRNA sequence (SEQ ID NO: 29)

Human coding sequence (SEQ ID NO: 30)

20

Table 8 (mouse gene: Ccnd3; human gene: CCND3)

Mouse genomic sequence (SEQ ID NO: 31)

Mouse mRNA sequence (SEQ ID NO: 32)

Mouse coding sequence (SEQ ID NO: 33)

25 Human genomic sequence (SEQ ID NO: 34)

Human mRNA sequence (SEQ ID NO: 35)

Human coding sequence (SEQ ID NO: 36)

Table 9 (mouse gene: Wnt3; human gene: WNT3)

30 Mouse genomic sequence (SEQ ID NO: 37)

Mouse mRNA sequence (SEQ ID NO: 38)

Mouse coding sequence (SEQ ID NO: 39)

Human genomic sequence (SEQ ID NO: 40)

Human mRNA sequence (SEQ ID NO: 41)

35 Human coding sequence (SEQ ID NO: 42)

Table 10 (mouse gene: Batf; human gene: BATF)

Mouse genomic sequence (SEQ ID NO: 43)

Mouse mRNA sequence (SEQ ID NO: 44)

Mouse coding sequence (SEQ ID NO: 45)
Human genomic sequence (SEQ ID NO: 46)
Human mRNA sequence (SEQ ID NO: 47)
Human coding sequence (SEQ ID NO: 48)

5

Table 11 (mouse gene: Irf4; human gene: IRF4)

Mouse genomic sequence (SEQ ID NO: 49)
Mouse mRNA sequence (SEQ ID NO: 50)
Mouse coding sequence (SEQ ID NO: 51)

10 Human genomic sequence (SEQ ID NO: 52)
Human mRNA sequence (SEQ ID NO: 53)
Human coding sequence (SEQ ID NO: 54)

Table 12 (mouse gene: Notch1; human gene: NOTCH1)

15 Mouse genomic sequence (SEQ ID NO: 55)
Mouse mRNA sequence (SEQ ID NO: 56)
Mouse coding sequence (SEQ ID NO: 57)
Human genomic sequence (SEQ ID NO: 58)
Human mRNA sequence (SEQ ID NO: 59)
20 Human coding sequence (SEQ ID NO: 60)

Table 13 (mouse gene: Myc; human gene MYC)

Mouse genomic sequence (SEQ ID NO: 61)
Mouse mRNA sequence (SEQ ID NO: 62)
25 Mouse coding sequence (SEQ ID NO: 63)
Human genomic sequence (SEQ ID NO: 64)
Human mRNA sequence (SEQ ID NO: 65)
Human coding sequence (SEQ ID NO: 66)

30 Table 14 (mouse gene Bach2; human gene BACH2)

Mouse genomic sequence (SEQ ID NO: 67)
Mouse mRNA sequence (SEQ ID NO: 68)
Mouse coding sequence (SEQ ID NO: 69)
Human genomic sequence (SEQ ID NO: 70)
35 Human mRNA sequence (SEQ ID NO: 71)
Human coding sequence (SEQ ID NO: 72)

Table 15 (mouse gene Wnt1; human gene WNT1)

Mouse genomic sequence (SEQ ID NO: 73)

- Mouse mRNA sequence (SEQ ID NO: 74)
 Mouse coding sequence (SEQ ID NO: 75)
 Human genomic sequence (SEQ ID NO: 76)
 Human mRNA sequence (SEQ ID NO: 77)
 5 Human coding sequence (SEQ ID NO: 78)

Table 16 (mouse gene Rasgrp1; human gene: RASGRP1)

- Mouse genomic sequence (SEQ ID NO: 79)
 Mouse mRNA sequence (SEQ ID NO: 80)
 10 Mouse coding sequence (SEQ ID NO: 81)
 Human genomic sequence (SEQ ID NO: 82)
 Human mRNA sequence (SEQ ID NO: 83)
 Human coding sequence (SEQ ID NO: 84)

15 Table 17 (mouse gene: Nmyc1; human gene: MYCN)

- Mouse genomic sequence (SEQ ID NO: 85)
 Mouse mRNA sequence (SEQ ID NO: 86)
 Mouse coding sequence (SEQ ID NO: 87)
 Human genomic sequence (SEQ ID NO: 88)
 20 Human mRNA sequence (SEQ ID NO: 89)
 Human coding sequence (SEQ ID NO: 90)

Table 18 (mouse gene: Myb; human gene: MYB)

- Mouse genomic sequence (SEQ ID NO: 91)
 25 Mouse mRNA sequence (SEQ ID NO: 92)
 Mouse coding sequence (SEQ ID NO: 93)
 Human genomic sequence (SEQ ID NO: 94)
 Human mRNA sequence (SEQ ID NO: 95)
 Human coding sequence (SEQ ID NO: 96)

30

Table 19 (mouse gene: Sox4; human gene: SOX4)

- Mouse genomic sequence (SEQ ID NO: 97)
 Mouse mRNA sequence (SEQ ID NO: 98)
 Mouse coding sequence (SEQ ID NO: 99)
 35 Human genomic sequence (SEQ ID NO: 100)
 Human mRNA sequence (SEQ ID NO: 101)
 Human coding sequence (SEQ ID NO: 102)

Table 20 (mouse gene: Tcof1; human gene: TCOF1)

Mouse genomic sequence (SEQ ID NO: 103)
 Mouse mRNA sequence (SEQ ID NO: 104)
 Mouse coding sequence (SEQ ID NO: 105)
 Human genomic sequence (SEQ ID NO: 106)
 5 Human mRNA sequence (SEQ ID NO: 107)
 Human coding sequence (SEQ ID NO: 108)

Table 21 (mouse gene: Pim1; human gene: PIM1)

Mouse genomic sequence (SEQ ID NO: 109)
 10 Mouse mRNA sequence (SEQ ID NO: 110)
 Mouse coding sequence (SEQ ID NO: 111)
 Human genomic sequence (SEQ ID NO: 112)
 Human mRNA sequence (SEQ ID NO: 113)
 Human coding sequence (SEQ ID NO: 114)

15

Table 22 (mouse gene: Wnt3a; human gene: WNT3A)

Mouse genomic sequence (SEQ ID NO: 115)
 Mouse mRNA sequence (SEQ ID NO: 116)
 Mouse coding sequence (SEQ ID NO: 117)
 20 Human genomic sequence (SEQ ID NO: 118)
 Human mRNA sequence (SEQ ID NO: 119)
 Human coding sequence (SEQ ID NO: 120)

Table 23 (mouse gene: Ly6e; human gene LY6E)

25 Mouse genomic sequence (SEQ ID NO: 121)
 Mouse mRNA sequence (SEQ ID NO: 122)
 Mouse coding sequence (SEQ ID NO: 123)
 Human genomic sequence (SEQ ID NO: 124)
 Human mRNA sequence (SEQ ID NO: 125)
 30 Human coding sequence (SEQ ID NO: 126)

Table 24 (mouse gene: Rasa2; human gene RASA2)

Mouse genomic sequence (SEQ ID NO: 127)
 Mouse mRNA sequence (SEQ ID NO: 128)
 35 Mouse coding sequence (SEQ ID NO: 129)
 Human genomic sequence (SEQ ID NO: 130)
 Human mRNA sequence (SEQ ID NO: 131)
 Human coding sequence (SEQ ID NO: 132)

Table 25 (mouse gene: Gata1; human gene GATA1)

- Mouse genomic sequence (SEQ ID NO: 133)
- Mouse mRNA sequence (SEQ ID NO: 134)
- Mouse coding sequence (SEQ ID NO: 135)
- 5 Human genomic sequence (SEQ ID NO: 136)
- Human mRNA sequence (SEQ ID NO: 137)
- Human coding sequence (SEQ ID NO: 138)

Table 26 (mouse gene: Fkbp5; human gene FKBP5)

- 10 Mouse genomic sequence (SEQ ID NO: 139)
- Mouse mRNA sequence (SEQ ID NO: 140)
- Mouse coding sequence (SEQ ID NO: 141)
- Human genomic sequence (SEQ ID NO: 142)
- Human mRNA sequence (SEQ ID NO: 143)
- 15 Human coding sequence (SEQ ID NO: 144)

Table 27 (mouse gene: Rel; human gene REL)

- Mouse genomic sequence (SEQ ID NO: 145)
- Mouse mRNA sequence (SEQ ID NO: 146)
- 20 Mouse coding sequence (SEQ ID NO: 147)
- Human genomic sequence (SEQ ID NO: 148)
- Human mRNA sequence (SEQ ID NO: 149)
- Human coding sequence (SEQ ID NO: 150)

Table 28 (mouse gene: Icsbp; human gene ICSBP1)

- 25 Mouse genomic sequence (SEQ ID NO: 151)
- Mouse mRNA sequence (SEQ ID NO: 152)
- Mouse coding sequence (SEQ ID NO: 153)
- Human genomic sequence (SEQ ID NO: 154)
- 30 Human mRNA sequence (SEQ ID NO: 155)
- Human coding sequence (SEQ ID NO: 156)

Table 29 (mouse gene: Bmi1; human gene BMI1)

- Mouse genomic sequence (SEQ ID NO: 157)
- 35 Mouse mRNA sequence (SEQ ID NO: 158)
- Mouse coding sequence (SEQ ID NO: 159)
- Human genomic sequence (SEQ ID NO: 160)
- Human mRNA sequence (SEQ ID NO: 161)
- Human coding sequence (SEQ ID NO: 162)

Table 30 (mouse gene: Runx1; human gene RUNX1)

Mouse genomic sequence (SEQ ID NO: 163)

Mouse mRNA sequence (SEQ ID NO: 164)

5 Mouse coding sequence (SEQ ID NO: 165)

Human genomic sequence (SEQ ID NO: 166)

Human mRNA sequence (SEQ ID NO: 167)

Human coding sequence (SEQ ID NO: 168)

10 Table 31 (mouse gene: Il2ra; human gene IL2RA)

Mouse genomic sequence (SEQ ID NO: 169)

Mouse mRNA sequence (SEQ ID NO: 170)

Mouse coding sequence (SEQ ID NO: 171)

Human genomic sequence (SEQ ID NO: 172)

15 Human mRNA sequence (SEQ ID NO: 173)

Human coding sequence (SEQ ID NO: 174)

Table 32 (mouse gene: Nfkb1; human gene NFKB1)

Mouse genomic sequence (SEQ ID NO: 175)

20 Mouse mRNA sequence (SEQ ID NO: 176)

Mouse coding sequence (SEQ ID NO: 177)

Human genomic sequence (SEQ ID NO: 178)

Human mRNA sequence (SEQ ID NO: 179)

Human coding sequence (SEQ ID NO: 180)

25

Table 33 (mouse gene: Fyn; human gene FYN)

Mouse genomic sequence (SEQ ID NO: 181)

Mouse mRNA sequence (SEQ ID NO: 182)

Mouse coding sequence (SEQ ID NO: 183)

30 Human genomic sequence (SEQ ID NO: 184)

Human mRNA sequence (SEQ ID NO: 185)

Human coding sequence (SEQ ID NO: 186)

Table 34 (mouse gene: Nfkbil1; human gene NFKBIL1)

35 Mouse genomic sequence (SEQ ID NO: 187)

Mouse mRNA sequence (SEQ ID NO: 188)

Mouse coding sequence (SEQ ID NO: 189)

Human genomic sequence (SEQ ID NO: 190)

Human mRNA sequence (SEQ ID NO: 191)

Human coding sequence (SEQ ID NO: 192)

Table 35 (mouse gene: Flt3; human gene FLT3)

Mouse genomic sequence (SEQ ID NO: 193)

5 Mouse mRNA sequence (SEQ ID NO: 194)

Mouse coding sequence (SEQ ID NO: 195)

Human genomic sequence (SEQ ID NO: 196)

Human mRNA sequence (SEQ ID NO: 197)

Human coding sequence (SEQ ID NO: 198)

10

Table 36 (mouse gene: Dntt; human gene DNTT)

Mouse genomic sequence (SEQ ID NO: 199)

Mouse mRNA sequence (SEQ ID NO: 200)

Mouse coding sequence (SEQ ID NO: 201)

15 Human genomic sequence (SEQ ID NO: 202)

Human mRNA sequence (SEQ ID NO: 203)

Human coding sequence (SEQ ID NO: 204)

Table 37 (mouse gene: Znfn1a1; human gene ZNFN1A1)

20 Mouse genomic sequence (SEQ ID NO: 205)

Mouse mRNA sequence (SEQ ID NO: 206)

Mouse coding sequence (SEQ ID NO: 207)

Human genomic sequence (SEQ ID NO: 208)

Human mRNA sequence (SEQ ID NO: 209)

25 Human coding sequence (SEQ ID NO: 210)

Table 38 (mouse gene: Tbx21; human gene TBX21)

Mouse genomic sequence (SEQ ID NO: 211)

Mouse mRNA sequence (SEQ ID NO: 212)

30 Mouse coding sequence (SEQ ID NO: 213)

Human genomic sequence (SEQ ID NO: 214)

Human mRNA sequence (SEQ ID NO: 215)

Human coding sequence (SEQ ID NO: 216)

35 Table 39 (mouse gene: Stat5b; human gene STAT5B)

Mouse genomic sequence (SEQ ID NO: 217)

Mouse mRNA sequence (SEQ ID NO: 218)

Mouse coding sequence (SEQ ID NO: 219)

Human genomic sequence (SEQ ID NO: 220)

Human mRNA sequence (SEQ ID NO: 221)

Human coding sequence (SEQ ID NO: 222)

Table 40 (mouse gene: Sema4d; human gene SEMA4D)

5 Mouse genomic sequence (SEQ ID NO: 223)

Mouse mRNA sequence (SEQ ID NO: 224)

Mouse coding sequence (SEQ ID NO: 225)

Human genomic sequence (SEQ ID NO: 226)

Human mRNA sequence (SEQ ID NO: 227)

10 Human coding sequence (SEQ ID NO: 228)

Table 41 (mouse gene: Mdm2; human gene MDM2)

Mouse genomic sequence (SEQ ID NO: 229)

Mouse mRNA sequence (SEQ ID NO: 230)

15 Mouse coding sequence (SEQ ID NO: 231)

Human genomic sequence (SEQ ID NO: 232)

Human mRNA sequence (SEQ ID NO: 233)

Human coding sequence (SEQ ID NO: 234)

20 Table 42 (mouse gene: Prlr; human gene PRLR)

Mouse genomic sequence (SEQ ID NO: 235)

Mouse mRNA sequence (SEQ ID NO: 236)

Mouse coding sequence (SEQ ID NO: 237)

Human genomic sequence (SEQ ID NO: 238)

25 Human mRNA sequence (SEQ ID NO: 239)

Human coding sequence (SEQ ID NO: 240)

Table 43 (mouse gene: Top1; human gene TOP1)

Mouse genomic sequence (SEQ ID NO: 241)

30 Mouse mRNA sequence (SEQ ID NO: 242)

Mouse coding sequence (SEQ ID NO: 243)

Human genomic sequence (SEQ ID NO: 244)

Human mRNA sequence (SEQ ID NO: 245)

Human coding sequence (SEQ ID NO: 246)

35

Table 44 (mouse gene: Dusp10; human gene DUSP10)

Mouse genomic sequence (SEQ ID NO: 247)

Mouse mRNA sequence (SEQ ID NO: 248)

Mouse coding sequence (SEQ ID NO: 249)

Human genomic sequence (SEQ ID NO: 250)
Human mRNA sequence (SEQ ID NO: 251)
Human coding sequence (SEQ ID NO: 252)

5 Table 45 (mouse gene: Fli1; human gene FLI1)

Mouse genomic sequence (SEQ ID NO: 253)
Mouse mRNA sequence (SEQ ID NO: 254)
Mouse coding sequence (SEQ ID NO: 255)
Human genomic sequence (SEQ ID NO: 256)

10 Human mRNA sequence (SEQ ID NO: 257)
 Human coding sequence (SEQ ID NO: 258)

Table 46 (mouse gene: Tk2; human gene TK2)

Mouse genomic sequence (SEQ ID NO: 259)
15 Mouse mRNA sequence (SEQ ID NO: 260)
 Mouse coding sequence (SEQ ID NO: 261)
 Human genomic sequence (SEQ ID NO: 262)
 Human mRNA sequence (SEQ ID NO: 263)
 Human coding sequence (SEQ ID NO: 264)

20

Table 47 (mouse gene: Nupr1)

Mouse genomic sequence (SEQ ID NO: 265)
Mouse mRNA sequence (SEQ ID NO: 266)
Mouse coding sequence (SEQ ID NO: 267)
25 Human genomic sequence (SEQ ID NO: 268)
 Human mRNA sequence (SEQ ID NO: 269)
 Human coding sequence (SEQ ID NO: 270)

Table 48 (mouse gene: Zfhx1b; human gene ZFHX1B)

30 Mouse genomic sequence (SEQ ID NO: 271)
 Mouse mRNA sequence (SEQ ID NO: 272)
 Mouse coding sequence (SEQ ID NO: 273)
 Human genomic sequence (SEQ ID NO: 274)
 Human mRNA sequence (SEQ ID NO: 275)
35 Human coding sequence (SEQ ID NO: 276)

Table 49 (mouse gene: Vdac1; human gene VDAC1)

Mouse genomic sequence (SEQ ID NO: 277)
Mouse mRNA sequence (SEQ ID NO: 278)

Mouse coding sequence (SEQ ID NO: 279)
Human genomic sequence (SEQ ID NO: 280)
Human mRNA sequence (SEQ ID NO: 281)
Human coding sequence (SEQ ID NO: 282)

5

Table 50 (mouse gene: Nfatc1; human gene NFATC1)

Mouse genomic sequence (SEQ ID NO: 283)
Mouse mRNA sequence (SEQ ID NO: 284)
Mouse coding sequence (SEQ ID NO: 285)
Human genomic sequence (SEQ ID NO: 286)
Human mRNA sequence (SEQ ID NO: 287)
Human coding sequence (SEQ ID NO: 288)

10

Table 51 (mouse gene: Syk; human gene SYK)

Mouse genomic sequence (SEQ ID NO: 289)
Mouse mRNA sequence (SEQ ID NO: 290)
Mouse coding sequence (SEQ ID NO: 291)
Human genomic sequence (SEQ ID NO: 292)
Human mRNA sequence (SEQ ID NO: 293)
Human coding sequence (SEQ ID NO: 294)

15

20

Table 52 (mouse gene: Gnb1; human gene GNB1)

Mouse genomic sequence (SEQ ID NO: 295)
Mouse mRNA sequence (SEQ ID NO: 296)
Mouse coding sequence (SEQ ID NO: 297)
Human genomic sequence (SEQ ID NO: 298)
Human mRNA sequence (SEQ ID NO: 299)
Human coding sequence (SEQ ID NO: 300).

25

Table 53 (mouse gene: Ccnd2; human gene CCND2)

Mouse genomic sequence (SEQ ID NO: 301)
Mouse mRNA sequence (SEQ ID NO: 302)
Mouse coding sequence (SEQ ID NO: 303)
Human genomic sequence (SEQ ID NO: 304)
Human mRNA sequence (SEQ ID NO: 305)
Human coding sequence (SEQ ID NO: 306)

30

35

Table 54 (mouse gene Tnfrsf6; human gene TNFRSF6)

Mouse genomic sequence (SEQ ID NO: 307)

- Mouse mRNA sequence (SEQ ID NO: 308)
 Mouse coding sequence (SEQ ID NO: 309)
 Human genomic sequence (SEQ ID NO: 310)
 Human mRNA sequence (SEQ ID NO: 311)
 5 Human coding sequence (SEQ ID NO: 312)

- Table 55 (mouse gene *Irf2*; human gene *IRF2*)
 Mouse genomic sequence (SEQ ID NO: 313)
 Mouse mRNA sequence (SEQ ID NO: 314)
 10 Mouse coding sequence (SEQ ID NO: 315)
 Human genomic sequence (SEQ ID NO: 316)
 Human mRNA sequence (SEQ ID NO: 317)
 Human coding sequence (SEQ ID NO: 318)

- 15 Table 56 (mouse gene *Morf*; human gene: *MORF*)
 Mouse genomic sequence (SEQ ID NO: 319)
 Mouse mRNA sequence (SEQ ID NO: 320)
 Mouse coding sequence (SEQ ID NO: 321)
 Human genomic sequence (SEQ ID NO: 322)
 20 Human mRNA sequence (SEQ ID NO: 323)
 Human coding sequence (SEQ ID NO: 324)

- Table 57 (mouse gene: *Runx3*; human gene: *RUNX3*)
 Mouse genomic sequence (SEQ ID NO: 325)
 25 Mouse mRNA sequence (SEQ ID NO: 326)
 Mouse coding sequence (SEQ ID NO: 327)
 Human genomic sequence (SEQ ID NO: 328)
 Human mRNA sequence (SEQ ID NO: 329)
 Human coding sequence (SEQ ID NO: 330)

- 30 Table 58 (mouse gene: *Bcl11b*; human gene: *BCL11B*)
 Mouse genomic sequence (SEQ ID NO: 331)
 Mouse mRNA sequence (SEQ ID NO: 332)
 Mouse coding sequence (SEQ ID NO: 333)
 35 Human genomic sequence (SEQ ID NO: 334)
 Human mRNA sequence (SEQ ID NO: 335)
 Human coding sequence (SEQ ID NO: 336)

Table 59 (mouse gene: *Arhgef1*; human gene: *ARHGEF1*)

- Mouse genomic sequence (SEQ ID NO: 337)
- Mouse mRNA sequence (SEQ ID NO: 338)
- Mouse coding sequence (SEQ ID NO: 339)
- Human genomic sequence (SEQ ID NO: 340)
- 5 Human mRNA sequence (SEQ ID NO: 341)
- Human coding sequence (SEQ ID NO: 342)

Table 60 (mouse gene: Ptpk; human gene: PTPRK)

- Mouse genomic sequence (SEQ ID NO: 343)
- 10 Mouse mRNA sequence (SEQ ID NO: 344)
- Mouse coding sequence (SEQ ID NO: 345)
- Human genomic sequence (SEQ ID NO: 346)
- Human mRNA sequence (SEQ ID NO: 347)
- Human coding sequence (SEQ ID NO: 348)

15

Table 61 (mouse gene: Mcmd5; human gene: MCM5)

- Mouse genomic sequence (SEQ ID NO: 349)
- Mouse mRNA sequence (SEQ ID NO: 350)
- Mouse coding sequence (SEQ ID NO: 351)
- 20 Human genomic sequence (SEQ ID NO: 352)
- Human mRNA sequence (SEQ ID NO: 353)
- Human coding sequence (SEQ ID NO: 354)

Table 62 (mouse gene: Matn4; human gene: MATN4)

- 25 Mouse genomic sequence (SEQ ID NO: 355)
- Mouse mRNA sequence (SEQ ID NO: 356)
- Mouse coding sequence (SEQ ID NO: 357)
- Human genomic sequence (SEQ ID NO: 358)
- Human mRNA sequence (SEQ ID NO: 359)
- 30 Human coding sequence (SEQ ID NO: 360)

Table 63 (mouse gene: Tnfsf11; human gene TNFSF11)

- Mouse genomic sequence (SEQ ID NO: 361)
- Mouse mRNA sequence (SEQ ID NO: 362)
- 35 Mouse coding sequence (SEQ ID NO: 363)
- Human genomic sequence (SEQ ID NO: 364)
- Human mRNA sequence (SEQ ID NO: 365)
- Human coding sequence (SEQ ID NO: 366)

Table 64 (mouse gene: Itk; human gene ITK)

Mouse genomic sequence (SEQ ID NO: 367)

Mouse mRNA sequence (SEQ ID NO: 368)

Mouse coding sequence (SEQ ID NO: 369)

5 Human genomic sequence (SEQ ID NO: 370)

Human mRNA sequence (SEQ ID NO: 371)

Human coding sequence (SEQ ID NO: 372)

Table 65 (mouse gene: Fish; human gene: N/A)

10 Mouse genomic sequence (SEQ ID NO: 373)

Mouse mRNA sequence (SEQ ID NO: 374)

Mouse coding sequence (SEQ ID NO: 375)

Human genomic sequence (SEQ ID NO: 376)

Human mRNA sequence (SEQ ID NO: 377)

15 Human coding sequence (SEQ ID NO: 378)

Table 66 (mouse gene: Egr2; human gene EGR2)

Mouse genomic sequence (SEQ ID NO: 379)

Mouse mRNA sequence (SEQ ID NO: 380)

20 Mouse coding sequence (SEQ ID NO: 381)

Human genomic sequence (SEQ ID NO: 382)

Human mRNA sequence (SEQ ID NO: 383)

Human coding sequence (SEQ ID NO: 384)

25 Table 67 (mouse gene: Sos1; human gene SOS1)

Mouse genomic sequence (SEQ ID NO: 385)

Mouse mRNA sequence (SEQ ID NO: 386)

Mouse coding sequence (SEQ ID NO: 387)

Human genomic sequence (SEQ ID NO: 388)

30 Human mRNA sequence (SEQ ID NO: 389)

Human coding sequence (SEQ ID NO: 390)

Table 68 (mouse gene: Pou2af1; human gene POU2AF1)

Mouse genomic sequence (SEQ ID NO: 391)

35 Mouse mRNA sequence (SEQ ID NO: 392)

Mouse coding sequence (SEQ ID NO: 393)

Human genomic sequence (SEQ ID NO: 394)

Human mRNA sequence (SEQ ID NO: 395)

Human coding sequence (SEQ ID NO: 396)

Table 69 (mouse gene: Mef2c; human gene MEF2C)

Mouse genomic sequence (SEQ ID NO: 397)

Mouse mRNA sequence (SEQ ID NO: 398)

5 Mouse coding sequence (SEQ ID NO: 399)

Human genomic sequence (SEQ ID NO: 400)

Human mRNA sequence (SEQ ID NO: 401)

Human coding sequence (SEQ ID NO: 402)

10 Table 70 (mouse gene: Map3k8; human gene MAP3K8)

Mouse genomic sequence (SEQ ID NO: 403)

Mouse mRNA sequence (SEQ ID NO: 404)

Mouse coding sequence (SEQ ID NO: 405)

Human genomic sequence (SEQ ID NO: 406)

15 Human mRNA sequence (SEQ ID NO: 407)

Human coding sequence (SEQ ID NO: 408)

Table 71 (mouse gene: Fgfr3; human gene FGFR3)

Mouse genomic sequence (SEQ ID NO: 409)

20 Mouse mRNA sequence (SEQ ID NO: 410)

Mouse coding sequence (SEQ ID NO: 411)

Human genomic sequence (SEQ ID NO: 412)

Human mRNA sequence (SEQ ID NO: 413)

Human coding sequence (SEQ ID NO: 414)

25

Table 72 (mouse gene: Cbx8; human gene CBX8)

Mouse genomic sequence (SEQ ID NO: 415)

Mouse mRNA sequence (SEQ ID NO: 416)

Mouse coding sequence (SEQ ID NO: 417)

30 Human genomic sequence (SEQ ID NO: 418)

Human mRNA sequence (SEQ ID NO: 419)

Human coding sequence (SEQ ID NO: 420)

Table 73 (mouse gene: Lmo2; human gene LMO2)

35 Mouse genomic sequence (SEQ ID NO: 421)

Mouse mRNA sequence (SEQ ID NO: 422)

Mouse coding sequence (SEQ ID NO: 423)

Human genomic sequence (SEQ ID NO: 424)

Human mRNA sequence (SEQ ID NO: 425)

Human coding sequence (SEQ ID NO: 426)

Table 74 (mouse gene: Itpr1; human gene ITPR1)

Mouse genomic sequence (SEQ ID NO: 427)

5 Mouse mRNA sequence (SEQ ID NO: 428)

Mouse coding sequence (SEQ ID NO: 429)

Human genomic sequence (SEQ ID NO: 430)

Human mRNA sequence (SEQ ID NO: 431)

Human coding sequence (SEQ ID NO: 432)

10

Table 75 (mouse gene: Sell; human gene SELL)

Mouse genomic sequence (SEQ ID NO: 433)

Mouse mRNA sequence (SEQ ID NO: 434)

Mouse coding sequence (SEQ ID NO: 435)

15 Human genomic sequence (SEQ ID NO: 436)

Human mRNA sequence (SEQ ID NO: 437)

Human coding sequence (SEQ ID NO: 438)

Table 76 (mouse gene: Dpt; human gene DPT)

20 Mouse genomic sequence (SEQ ID NO: 439)

Mouse mRNA sequence (SEQ ID NO: 440)

Mouse coding sequence (SEQ ID NO: 441)

Human genomic sequence (SEQ ID NO: 442)

Human mRNA sequence (SEQ ID NO: 443)

25 Human coding sequence (SEQ ID NO: 444)

Table 77 (mouse gene: Pap; human gene PAP)

Mouse genomic sequence (SEQ ID NO: 445)

Mouse mRNA sequence (SEQ ID NO: 446)

30 Mouse coding sequence (SEQ ID NO: 447)

Human genomic sequence (SEQ ID NO: 448)

Human mRNA sequence (SEQ ID NO: 449)

Human coding sequence (SEQ ID NO: 450)

35 Table 78 (mouse gene: Blm; human gene BLM)

Mouse genomic sequence (SEQ ID NO: 451)

Mouse mRNA sequence (SEQ ID NO: 452)

Mouse coding sequence (SEQ ID NO: 453)

Human genomic sequence (SEQ ID NO: 454)

Human mRNA sequence (SEQ ID NO: 455)

Human coding sequence (SEQ ID NO: 456)

Table 79 (mouse gene: Blr1; human gene BLR1)

5 Mouse genomic sequence (SEQ ID NO: 457)

Mouse mRNA sequence (SEQ ID NO: 458)

Mouse coding sequence (SEQ ID NO: 459)

Human genomic sequence (SEQ ID NO: 460)

Human mRNA sequence (SEQ ID NO: 461)

10 Human coding sequence (SEQ ID NO: 462)

Table 80 (mouse gene: Ptp4a2; human gene PTP4A2)

Mouse genomic sequence (SEQ ID NO: 463)

Mouse mRNA sequence (SEQ ID NO: 464)

15 Mouse coding sequence (SEQ ID NO: 465)

Human genomic sequence (SEQ ID NO: 466)

Human mRNA sequence (SEQ ID NO: 467)

Human coding sequence (SEQ ID NO: 468)

20 Table 81 (mouse gene: Mcm3ap; human gene MCM3AP)

Mouse genomic sequence (SEQ ID NO: 469)

Mouse mRNA sequence (SEQ ID NO: 470)

Mouse coding sequence (SEQ ID NO: 471)

Human genomic sequence (SEQ ID NO: 472)

25 Human mRNA sequence (SEQ ID NO: 473)

Human coding sequence (SEQ ID NO: 474)

Table 82 (mouse gene: Jak2; human gene JAK2)

Mouse genomic sequence (SEQ ID NO: 475)

30 Mouse mRNA sequence (SEQ ID NO: 476)

Mouse coding sequence (SEQ ID NO: 477)

Human genomic sequence (SEQ ID NO: 478)

Human mRNA sequence (SEQ ID NO: 479)

Human coding sequence (SEQ ID NO: 480)

35

Table 83 (mouse gene: Fus1; human gene FUS1)

Mouse genomic sequence (SEQ ID NO: 481)

Mouse mRNA sequence (SEQ ID NO: 482)

Mouse coding sequence (SEQ ID NO: 483)

Human genomic sequence (SEQ ID NO: 484)

Human mRNA sequence (SEQ ID NO: 485)

Human coding sequence (SEQ ID NO: 486)

5 Table 84 (mouse gene: Rassf1; human gene RASSF1)

Mouse genomic sequence (SEQ ID NO: 487)

Mouse mRNA sequence (SEQ ID NO: 488)

Mouse coding sequence (SEQ ID NO: 489)

Human genomic sequence (SEQ ID NO: 490)

10 Human mRNA sequence (SEQ ID NO: 491)

Human coding sequence (SEQ ID NO: 492)

Table 85 (mouse gene: Pik3r1; human gene PIK3R1)

Mouse genomic sequence (SEQ ID NO: 493)

15 Mouse mRNA sequence (SEQ ID NO: 494)

Mouse coding sequence (SEQ ID NO: 495)

Human genomic sequence (SEQ ID NO: 496)

Human mRNA sequence (SEQ ID NO: 497)

Human coding sequence (SEQ ID NO: 498)

20

Table 86 (mouse gene: Braf; human gene BRAF)

Mouse genomic sequence (SEQ ID NO: 499)

Mouse mRNA sequence (SEQ ID NO: 500)

Mouse coding sequence (SEQ ID NO: 501)

25 Human genomic sequence (SEQ ID NO: 502)

Human mRNA sequence (SEQ ID NO: 503)

Human coding sequence (SEQ ID NO: 504)

Table 87 (mouse gene: Tle3; human gene: TLE3)

30 Mouse genomic sequence (SEQ ID NO: 505)

Mouse mRNA sequence (SEQ ID NO: 506)

Mouse coding sequence (SEQ ID NO: 507)

Human genomic sequence (SEQ ID NO: 508)

Human mRNA sequence (SEQ ID NO: 509)

35 Human coding sequence (SEQ ID NO: 510)

Table 88 (mouse gene: Nek2; human gene NEK2)

Mouse genomic sequence (SEQ ID NO: 511)

Mouse mRNA sequence (SEQ ID NO: 512)

Mouse coding sequence (SEQ ID NO: 513)
Human genomic sequence (SEQ ID NO: 514)
Human mRNA sequence (SEQ ID NO: 515)
Human coding sequence (SEQ ID NO: 516)

5

Table 89 (mouse gene: Nr3c1; human gene NR3C1)

Mouse genomic sequence (SEQ ID NO: 517)
Mouse mRNA sequence (SEQ ID NO: 518)
Mouse coding sequence (SEQ ID NO: 519)

10 Human genomic sequence (SEQ ID NO: 520)
Human mRNA sequence (SEQ ID NO: 521)
Human coding sequence (SEQ ID NO: 522)

Table 90 (mouse gene: Dad1; human gene DAD1)

15 Mouse genomic sequence (SEQ ID NO: 523)
Mouse mRNA sequence (SEQ ID NO: 524)
Mouse coding sequence (SEQ ID NO: 525)
Human genomic sequence (SEQ ID NO: 526)
Human mRNA sequence (SEQ ID NO: 527)
20 Human coding sequence (SEQ ID NO: 528)

Table 91 (mouse gene: Lck; human gene LCK)

Mouse genomic sequence (SEQ ID NO: 529)
Mouse mRNA sequence (SEQ ID NO: 530)
25 Mouse coding sequence (SEQ ID NO: 531)
Human genomic sequence (SEQ ID NO: 532)
Human mRNA sequence (SEQ ID NO: 533)
Human coding sequence (SEQ ID NO: 534)

30 Table 92 (mouse gene: Git2; human gene GIT2)

Mouse genomic sequence (SEQ ID NO: 535)
Mouse mRNA sequence (SEQ ID NO: 536)
Mouse coding sequence (SEQ ID NO: 537)
Human genomic sequence (SEQ ID NO: 538)
35 Human mRNA sequence (SEQ ID NO: 539)
Human coding sequence (SEQ ID NO: 540).

Table 93 (mouse gene: Anp32; human gene N/A)

Mouse genomic sequence (SEQ ID NO: 541)

- Mouse mRNA sequence (SEQ ID NO: 542)
Mouse coding sequence (SEQ ID NO: 543)
Human genomic sequence (SEQ ID NO: 544)
Human mRNA sequence (SEQ ID NO: 545)
5 Human coding sequence (SEQ ID NO: 546).

Table 94 (mouse gene: Map2k5; human gene MAP2K5)

- Mouse genomic sequence (SEQ ID NO: 547)
Mouse mRNA sequence (SEQ ID NO: 548)
10 Mouse coding sequence (SEQ ID NO: 549)
Human genomic sequence (SEQ ID NO: 550)
Human mRNA sequence (SEQ ID NO: 551)
Human coding sequence (SEQ ID NO: 552).

15 Table 95 (mouse gene: Cd28; human gene CD28)

- Mouse genomic sequence (SEQ ID NO: 553)
Mouse mRNA sequence (SEQ ID NO: 554)
Mouse coding sequence (SEQ ID NO: 555)
Human genomic sequence (SEQ ID NO: 556)
20 Human mRNA sequence (SEQ ID NO: 556)
Human coding sequence (SEQ ID NO: 558).

Table 96 (mouse gene: Sept9; human gene Msf)

- Mouse genomic sequence (SEQ ID NO: 559)
25 Mouse mRNA sequence (SEQ ID NO: 560)
Mouse coding sequence (SEQ ID NO: 561)
Human genomic sequence (SEQ ID NO: 562)
Human mRNA sequence (SEQ ID NO: 563)
Human coding sequence (SEQ ID NO: 564).

30

Table 97 (mouse gene: Fzd10; human gene FZD10)

- Mouse genomic sequence (SEQ ID NO: 565)
Mouse mRNA sequence (SEQ ID NO: 566)
Mouse coding sequence (SEQ ID NO: 567)
35 Human genomic sequence (SEQ ID NO: 568)
Human mRNA sequence (SEQ ID NO: 569)
Human coding sequence (SEQ ID NO: 570).

Table 98 (mouse gene: Calm2; human gene CALM2)

Mouse genomic sequence (SEQ ID NO: 571)
 Mouse mRNA sequence (SEQ ID NO: 572)
 Mouse coding sequence (SEQ ID NO: 573)
 Human genomic sequence (SEQ ID NO: 574)
 5 Human mRNA sequence (SEQ ID NO: 575)
 Human coding sequence (SEQ ID NO: 576).

Table 99 (mouse gene: Ncf4; human gene NCF4)

Mouse genomic sequence (SEQ ID NO: 577)
 10 Mouse mRNA sequence (SEQ ID NO: 578)
 Mouse coding sequence (SEQ ID NO: 579)
 Human genomic sequence (SEQ ID NO: 580)
 Human mRNA sequence (SEQ ID NO: 581)
 Human coding sequence (SEQ ID NO: 582).

15

Table 100 (mouse gene: Rac2; human gene RAC2)

Mouse genomic sequence (SEQ ID NO: 583)
 Mouse mRNA sequence (SEQ ID NO: 584)
 Mouse coding sequence (SEQ ID NO: 585)
 20 Human genomic sequence (SEQ ID NO: 586)
 Human mRNA sequence (SEQ ID NO: 587)
 Human coding sequence (SEQ ID NO: 588).

Table 101 (mouse gene: Mbnl; human gene MBNL)

25 Mouse genomic sequence (SEQ ID NO: 589)
 Mouse mRNA sequence (SEQ ID NO: 590)
 Mouse coding sequence (SEQ ID NO: 591)
 Human genomic sequence (SEQ ID NO: 592)
 Human mRNA sequence (SEQ ID NO: 593)
 30 Human coding sequence (SEQ ID NO: 594).

Table 102 (mouse gene: mCG10516; human gene N/A)

Mouse genomic sequence (SEQ ID NO: 595)
 Mouse mRNA sequence (SEQ ID NO: 596)
 35 Mouse coding sequence (SEQ ID NO: 597)
 Human genomic sequence (SEQ ID NO: 598)
 Human mRNA sequence (SEQ ID NO: 599)
 Human coding sequence (SEQ ID NO: 600)

Table 103 (mouse gene: Rorc; human gene RORC)

Mouse genomic sequence (SEQ ID NO: 601)

Mouse mRNA sequence (SEQ ID NO: 602)

Mouse coding sequence (SEQ ID NO: 603)

5 Human genomic sequence (SEQ ID NO: 604)

Human mRNA sequence (SEQ ID NO: 605)

Human coding sequence (SEQ ID NO: 606)

Table 104 (mouse gene mCG15938; human gene BAT1)

10 Mouse genomic sequence (SEQ ID NO: 607)

Mouse mRNA sequence (SEQ ID NO: 608)

Mouse coding sequence (SEQ ID NO: 609)

Human genomic sequence (SEQ ID NO: 610)

Human mRNA sequence (SEQ ID NO: 611)

15 Human coding sequence (SEQ ID NO: 612)

Table 105 (mouse gene: Iqgap1; human gene IQGAP1)

Mouse genomic sequence (SEQ ID NO: 613)

Mouse mRNA sequence (SEQ ID NO: 614)

20 Mouse coding sequence (SEQ ID NO: 615)

Human genomic sequence (SEQ ID NO: 616)

Human mRNA sequence (SEQ ID NO: 617)

Human coding sequence (SEQ ID NO: 618)

25 Table 106 (mouse gene Zpf29; human gene: hCG27579)

Mouse genomic sequence (SEQ ID NO: 619)

Mouse mRNA sequence (SEQ ID NO: 620)

Mouse coding sequence (SEQ ID NO: 621)

Human genomic sequence (SEQ ID NO: 622)

30 Human mRNA sequence (SEQ ID NO: 623)

Human coding sequence (SEQ ID NO: 624)

Table 107 (mouse gene: Kcnj9; human gene: KCNJ9)

Mouse genomic sequence (SEQ ID NO: 625)

35 Mouse mRNA sequence (SEQ ID NO: 626)

Mouse coding sequence (SEQ ID NO: 627)

Human genomic sequence (SEQ ID NO: 628)

Human mRNA sequence (SEQ ID NO: 629)

Human coding sequence (SEQ ID NO: 630)

Table 108 (mouse gene: Ppp3cc; human gene: PPP3CC)

Mouse genomic sequence (SEQ ID NO: 631)

Mouse mRNA sequence (SEQ ID NO: 632)

Mouse coding sequence (SEQ ID NO: 633)

5 Human genomic sequence (SEQ ID NO: 634)

Human mRNA sequence (SEQ ID NO: 635)

Human coding sequence (SEQ ID NO: 636)

Table 109 (mouse gene: mCG9110; human gene: hCG27579)

10 Mouse genomic sequence (SEQ ID NO: 637)

Mouse mRNA sequence (SEQ ID NO: 638)

Mouse coding sequence (SEQ ID NO: 639)

Human genomic sequence (SEQ ID NO: 640)

Human mRNA sequence (SEQ ID NO: 641)

15 Human coding sequence (SEQ ID NO: 642)

Table 110 (mouse gene: mCG2257; human gene: PRDM11)

Mouse genomic sequence (SEQ ID NO: 643)

Mouse mRNA sequence (SEQ ID NO: 644)

20 Mouse coding sequence (SEQ ID NO: 645)

Human genomic sequence (SEQ ID NO: 646)

Human mRNA sequence (SEQ ID NO: 647)

Human coding sequence (SEQ ID NO: 648)

25 Table 111 (mouse gene: mCG17918; human gene: hCG23764)

Mouse genomic sequence (SEQ ID NO: 649)

Mouse mRNA sequence (SEQ ID NO: 650)

Mouse coding sequence (SEQ ID NO: 651)

Human genomic sequence (SEQ ID NO: 652)

30 Human mRNA sequence (SEQ ID NO: 653)

Human coding sequence (SEQ ID NO: 654)

Table 112 (mouse gene: Lfng; human gene: LFNG)

Mouse genomic sequence (SEQ ID NO: 655)

35 Mouse mRNA sequence (SEQ ID NO: 656)

Mouse coding sequence (SEQ ID NO: 657)

Human genomic sequence (SEQ ID NO: 658)

Human mRNA sequence (SEQ ID NO: 659)

Human coding sequence (SEQ ID NO: 660).

40

Table 1

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000619	GATCAAAGCAATCTCTATGTCTTTCTCTGCTG TCCTCCTCAGACATCTCCAGAGAGCTGGGAT ATTTTTCTTTCCCATTTGAGATTATGAAGTTG TTTCTAGAGTGCAATGACGCAGGTTGAAGGAT AAGTACACAGGTCCCAAGGAACCAAGCGTTT TCACTGACGGTGATGAGTCTTGTTCTGTGAGA TTGTTGTGATTCTCAGCCTTTCTCTTCCCCTG TGTGTGCTCTTCATTTCTGGTTCTGTCTGCC TAGCACCTCCTGGGGAAGCTGCTGTGCTTT	p000632	A	<i>Spr</i>
IM000620	GATCTTTGGAGCCCAGTTGTTAATCATAAGA GCTGATATTTGAAAGAGTGTGTCAACCTAG ATGCACAGGGAAGCCAAAGCATTGAGCC	p000633	D	--
IM000621	ATATGACCACAAGGAAATAAGATAAAGTGTT CATACTGAATTTATAATGAAAAGTGATC	p000634	C	--
IM000622	GAACAGGCATGGCTTTACTTGTAATGAGG AAACCAAGGCAGAGATTGCAAAGCGGGTCC TACACGTTTGCTCCATGCCCTGCTTCTCTGA CCACAGTGTACTGAGAATATGCTGAGCCCTA GTTCTGGGGAGGAGGCAGAAGAGAGCAGC ATCCTGCCCCACTTGAAGGCGTGACACATAG TTCCTGTCTGATC	p000638	D	--
IM000623	GATCAGGAGACCACACCCAGCTAGCCTTCTC TGACTGGGTATCCTTGGTCAGCCAGCCTTTC TTCACCTCATGTTCTCATTTGCAAATCACAT GAACACTATTTGACCTACACACTTCATAAAGC TGTTTTTAGAAAGACGAGATAATACAGGAGG AACGCTACAATATTAAATGATATGATTTATA T	p000639	D	--
IM000624	AGTGTTTAGGTCAGCTGGTGCAGGAGAAGC TTCTTGAGGAAGACGACCATCTGGCAAGGC CTGATGGTAGAAAATAATGGACTTCTCTCCA ACTGAGTAGGAACCTGATGATC	p000640	D	--
IM000625	ATCAGTAAGTTAATCCTAAGAATTACTATGCA TTTTTCCCCTCTTTTTAACAACATTCCCTCTT AGCTTATATGAGGCTCTAGTGCCCGGAGACT TTAATACTGCCCTAACATGATGGTGGCTCTTT GTCCCTCTTTCTCAGCCACTGAAATCTGACA GTTTGGGGAAGAATAATAAGAATTTAAGAAA CTAGATGGTTTTAAATATAGATATAAAAACAG TTCTTCGACTATTCTCAATAAAGAAATTCAGT CAAAAGAATTTGAGTCCCTAACACAATGATC	p000641	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000626	GATCATCAGAGTCCTGCATCTTATGTGTGCA GTGTTTTAGCAATACAGGCTTACCTTCAAC CTCTAACAGGCAACCAGATGCTACAATAGCT TATATTGTTTTAGAAATCACTTGGACTACTCT AAACAACAACCTTGAGTGAAGGCTCTTTGTAT CTGATACTGGAGTTTGTAGTCTATGACACTT GTGGGGAGACATGTCTGCACAAGTAGCATAT GTGTGTACATGTATATTGTATACATATATAGT TTTGCTCTATGTATGTATGTGTATATGTATGT ATGTATATGTATATGTATGTATATATATAG	p000642	D	--
IM000627	AAGGGACCTGATAATCGTGTGGCAACTGG GCTACAATTAGTTATCAATTGCTTGCTTGCCA CCTGCCCTGCTCCATAGAGAATCATAGTCTG GGGAGTGTGGAGGAATAGCGGAGTCATCTA AACACATCACTGCTGCCCCCACCATTGCTT GCCACCAGGCCCTGCCTTTCATTTGCATT TCTCCCTCTTACAAGCAAATGGCGCTCACTG ATC	p000643	D	--
IM000628	GTTTGGGGATTGTACAGAATGCACAGCGTAG TATTCAGGAAAAAGGAACTGGGAAATTAAT GTATAAATTAATCAGCTTTTAATTAGCTTA ACACACACATACGAAGGCAAAAATGTAACGT TACTTTGATC	p000644	K	<i>Myc</i>
IM000629	GATCTCATTACAGATGGTTGTGAGCTACCAT GTGG	p000647	R	--
IM000630	GATCTCAGGAGGCACCGAGAGACTCAGCAT GGACTCAAATGAGTACCCTGGCAGCCCGCA ACACCAGCTGTGTAACTACCGTGAGGGAT GTCTTCCCTGCCTCCCTCCAGCCCTTCTCA GGCCCTGAGTCCAGTGTGCAAAGCTCATCAT GGTAGTCCCCTTCACCT	p000649	K	<i>Gfi1</i>
IM000631	AGAGCACCCGACTGCTCTTCCGAAGGTCCA GAGTTCAAATCCCAGCAACCACATGGTGGCT CACAACCATCCGTAACAAGATC	p000650	R	--
IM000632	GATCAAATCCTGTCAGGGAGAGGGGCTCCT CCCAGTAGTGCCATCCCATAATAAAGAAG GACTCCTGGGCCTCAGTGAAGTCAGGCTGA CCACTACTGCAGTTAGTCATGACCAGTAGC CAGAATGGAACGAAGGGTGACCCAGTGTGA GGACACAGCCCCAGGCAACTGCTTCTGCTTT GAGCCAAGTTGTTACCCCAAAGCTCGTCATT CCGCTTGGTTTCTCATGTGTGTGAGCTGCAC ATATGGAGGTCCCCCTTGTTCCTT	p000651	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000633	GTGAGGAAGGTCCCTCTGCATTCTAACCTTC CTCAACTCCACCAGCCTCGGCGTTTAAGGGA GAAATATTACCGTTCCCTTTGGGCCAAGTTG GAGCCAGTGAAGTAGTCGGAAATGTACAGTC ACAGGAAATTGCTGCTACCAAGGCTGGAGG AACAAAGAGAAGACTTGTCACAAGAGGCCAG AGAGGAAGTCACCCAGTACAACTGAAGCG CGCGCGCACACACACACACACACACACA CACGCACACACACACACACACGATC	p000652	D	--
IM000634	TGGCCGCCTAGACAAGCTGACCATCACCTC CCAGAACCTGCAACTGGAGAGCCTTCGCAT GAAGCTTCCGAAATGTGCGTGCTCCACCTGT CCCTCACCTCACAGACATCATTTCTCCATTTA GCCCCTCCCGATC	p000654	A	<i>li</i>
IM000635	GATCCCCTGGAATTTACAGTCGGTTCCAACA ATCATGTAGATG	p000656	C	--
IM000636	GATCGGCTATAGCATTTGTCAATGTTTACCCA GAAGAATAGCACAGATATATTTGCACATCAAT GCTTATTGCAGTATTATTCACAGTGGCTATGT AATGGAACCAACCTACATGGCCAGCAACTGA ATAGATTAAAGAAAATATATACACAATGGTG CTTTTTTCGGCTATAAAGAAGAATGAAGTTAT GTTGTTTGTAGAAGATGGATGAAAGTGGAG ATGATAATATCAAGTGCACAGTCAACCTCTCT CTCTCACCTCCCCCGCCCCGCTCTTCTCTC TCATATACATTTGAGAGTAGCAGTAACTGTC TGAGAACAAAGGGGATTAAATGGGAGGGGAG AAGATTAAGGAGCGGAAGGGTAGTAGGTAG TAT	p000659	A	<i>Cr2</i>
IM000637	GATCGGCTTCTATGGACTGAGTGTGTAAGAA AACATT	p000661	D	--
IM000638	TTAGGAGGGTAGAGAACATTCAGGAATCAAG AACAAGCATTTTAACACCCACTGAGCTATCC TGTGGATGGTGGTGGTTTTGTTGTTTGTG GTTTTGTTTAGGAAGTCAGGGATGGGGTGG GAATCTCACTCTGTGGCTTAGACTTGCAACA ATCCCAAATTCTGGAATGATAAGCAAGAGAG CTGTCTAGTCCCAGTCTCAGATACATGCTGT TAATTTTCTACTACTGCTATAACACATAGGCT CAAATGCGGTGGCTTACCTAACACACCCTGT GCAGTTCTGAAAGTCGTAACCTCTGGCAGAT C	p000662	D	--
IM000639	ATGCTAAGCTGTGACTCCTCTCGATACGAGA CCCTGGCTGCCCTCCTTCCCGATC	p000663	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000640	GATCGTCTGGAAGAGCAGTCAGTATTCTTAA CTGCTGAGCCATCTTTGCAGCCCCCAGTTCT TTGGGGTTTTTTGTTTGTGTTGTTGGTTGGTT GGTTGGTTTGGTTTAGTTTGGTTTGGTTCAA GACAGGGTTTCTCTGTGTTGCCCTGGATGTC CTGGAACCTCTCTTTGTAGACCAGGGTGGCCT TTAACTCACAGAAATGCGCCTGCTAGGATTA AAGCTGTGTCCCACCACTATATATATATGTGT G	p000665	R	--
IM000641	GTCACAGTGTTAGAGCCACAGACGGGGGAA CCTACTGGCTGTCTGGGTTCTGTAAACTA GGGGACAAAGCTGCCACAGCCAGACTTAGC TGCGATC	p000666	D	--
IM000642	GATCGCTGCTTCTGTAAATCCGCAACGACAA TTGTTATCTTCTCCTTTTCTTCTTTTATTGT TTTATTCTATTTATTTTTCAGATGAACTCTCA TGTAGCCCAGGCTGGTCTCAAACCTCCTCTG TAGCTGACGGCAACCTTGAAC	p000668	R	--
IM000643	TTCTACACCATAGCATTAGTTGTAGGCAG AAGCGATC	p000669	D	--
IM000644	GATCGGCTCAAGGGCTCTAATTTAGTCTAGG AAGTCCTTAGGAAACATGAAAATCTCCGAGA TAAGACCCGGGGTAAAAAGCTTGAGCCACG GAGTTAGACATGCCAGGGTGGAGTCATGTT CAGAGGTTCAAGACCCGAATCAGCTACGTAA ATAAAGCATTTGAGGCCTACCTGGGCTACAA GAGAGTATCTTTAAATAAATAAGATGATTTAA AAAAAACTGTTTTCCCTTAGATGGATTAAAA AAACAAGACAAAACAAAACAAAACAAAACC CGTCTTTCCTTCTTAA	p000672	D	--
IM000645	CTGTCCGTGTGGGAAACGTTTAGCAAGTCCG AGCGTGTTTCGATC	p000673	K	Nmyc
IM000646	ATGCGTTCGTATGACAGTTCTCAAATGACT GTCCCAAAGTCCCAGATTCTTGAAACAGTA AAGACTGCCTCAAACCTGTAGTCACTAGTCTA TTATCTTAATCATAGTAACCATTTGGGTTTGA CTTGAAACCTGTGACAGGGAGATAAATTC TGCCACTGTAGGTGAAGCTTGAAGGGCTA ACCCAATGAATATGCTCAGTCGATC	p000676	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000647	AGATGAAGCTATCCCCAGTCCCTAAGCTGAG TTCTGCCTGAGACTATTTGAAACAGGGTACC CCTGGGTCCCAGTTCAGTTGACAGGTAGTG GACGCATGAGAACGCCATACCTGGTGGCCG TGCCCGAGAGTGCTGTCCCTGACCTGCCAC TGTGTTCTCCAGAGCAGCTTTCCAATCTGCC TGCTCCTGTCTCCCCTGCCTGTTGGCACCAG GCAGCCAGAATTCCATTTGTTTGTTCCTCG CGATAGGCTCTTGCCATGTAGTCCTTCTGG CCTAGAACTTGATATGTAGACTTCCCCCTT GGATC	p000678	C	--
IM000648	CCGTGTCCGTGGGCATGTGCGTGTACAGAC AGACATACATGCCCCGCATGAGTGTGAACA CCAGAGGTCAACCTCAGGTGTCTTTTGATG TTATCTACCTTGTTTTTTGAAGCAAGGTCTAG GATTGACCAATGAGCCCCAAGTAGGGATC	p000679	D	--
IM000649	GATCCATAGGCAGAGAAGGCAGTAATAGGA CATTGGTCATTGTACCTCATTTGTGAGGGGT CACCTTGAAATGTGCTGAGACTAGGTTCTA GGAGAAGCTCGCCA	p000682	D	--
IM000650	CTGGCACTGTGTGGCAGAAACAGTGAACAG TGTAGCGGTGCAGAAATGTGTGTGCTGTGGG TTTTAGCACCAGGGCTGCATGAGACTGCAGA CATGCTTATGACGCAGGAAGGCTCAGGACA CAGCACACATGTGTGCTAACATACATGTTTC ACCTCAGACTCAGCTCCCATTTGACTTTTAAT TAATTTTTGGCCATTCCACAACAGAACCTTTT CTTGCTCCCTTTTTTCAATCTTATGTATATATC TCCTACATTTAGTTACAGGACTGTGACCTAC AGTTTAAACTCGGGGATC	p000684	D	--
IM000651	GATCCCTCCCCTCCCTTCTTTTCCCGCCAA GCGTCGGCGAAGCCCTGCCCTTCAGGAGGC AGGAGGGGAGCTGAGTGAGGCGAGTCGGA CCCAGCAGCTGAGAGCAGCGCAGCCCAGG GGTCCTCGGCCGCGCAGACCCCCGGAATAA	p000685	K	<i>Myc</i>
IM000652	CTACCACAGCCCCAGTGCTCTGGAGGGACT CTAGTAGCCAGGGCTGGCAGCTTGTTTGG GCCAGCATCTCACTATGTAGCCTAGTTGTCC TGGAATTTGCTATGTAAATGTGGCTACCCTC AAACTCATAGAGAGCCTCCACCTCTCCTGA GATTATAGGCACATGCTACCATGCCCTAAGT GGATC	p000686	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000653	GGAGCAGGCCCTTCTGAATCAACTTGGCAG AGTGAAGGAGGCACTCTCCACACAAACAGG AAAAGGGCAGTGGTGACTTTCTAGGCAGGG AACTGGTTACATTTTGTATTGAAAGGTGAA GAGTCGTGACATTCTGGGAAATAGGCAAGAT GGCCGTTTCCCCTCAGCTACAACCAGCCATG CAGACCTCCTTGCAGGGACCTGGCTATCTAC ACTGGAACCAGAAAGGCACGCCCTGCTTA GCCTCAGGCAGAACGATAATAACAGCGTGCT AGCTCAGTAGTCTGTGTGCTGGAAGGGTTTA TGAGGAGGAAGTCCGCAATTACATATTTCTG GGCAAACATTAACCAAGATTGAAACCTAGAT TTGAAGAGAAGTAGCAGGCTGGGATC	p000687	D	--
IM000654	AGATGAACTTATAAATGCATCTGCAGTCCTC AAATAAAGATGAATAGTAACCCAGAGGCGTG GTAGTGCGCTCTTCAAACCCAGTGCTCAGAA GGTGCAAACAAAAGGACCGGGAGTCCAAGG CTAGCCTTGACTAGAAGGGGCCATGTCTCAA AGAACAACAACCAAGAGCTGCTTATGGAGGT CAGTCTGTGTTCCAGGGGGACAGCATCAG TCTAAGTTGGCGGTTGTTGTTGGCTGAGCAT GCACAAATCCCTAACAGCACATAAAGCAAGT TGTGTCACACACTCACAGTGCCCAGATTAC TGGATC	p000688	B	Mm.13133 6
IM000655	GTCCATTGTGTA CTGAGAGAGGAGTTAGGTT TAGAAAGCCTTCCTCAGATGTCCCTCAAAGA AGCTGCTACA ACTGCCCTCATCCACGTTGC CAAGGATC	p000689	D	--
IM000656	AGCTGTAGGGAAGCCCAAAGCACAGACGAC TGCTGCTGCTGCTGCGGTTCCCACTCTGGGT TGACCTTAGAAACGGGGGTTTCATCTCCTCCA GCAGCTCCGGGAAGGAAGGTGAAGGGGACT AACCATGATGAGCTTTGCACACTGGACTCAG GGCCTGAGAAGGGGCTGGAGGGAGGCAGG GAAGACATCCCTCACGGTAGTGTACACAGC TGCGGTTGCGGGCTGCCAGGGTACTCATT GAGTCCATGCTGAGTCTCTCGGTGCCTCCTG AGATC	p000694	K	Gfi1

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000657	GATCGCCCCAGTTACCTCAAATTGTGTGAGT GTGTGTGTGTGTGTGTATGCATATATGCATA CAAGCATATACATGCATGCATATATAATAC ACATAGACATATATACACACATATAGACGCAT ACATGCATTTGTATGCATGCATCTATGTATGT ACATATCCACAACCAATATACCAACACGC AGACACAGCACACATAGGACAATAGTAATTG TGAATCTAACTGGTGGGGTTTATGGGTCAAG AGCCAGGGTAGAGGAACTGGCTAAGGCTC TAACCATCCTAGAGCAGGCACATCTACCAGG AAAAGAAACAAGGAAAAGAGCAGAGTTGAG GGTTACTTAACATG	p000695	D	--
IM000658	ACAGAATCTGTGGGTCATTATTACGTTTATAG GAACAGGATTTTCTTTCTTTCTGACTCTACC TTCTAGAAAGGCCGACTTTTAAATCCTCATG CTCTTGTCTATTGACAGGAAAAGATGGGCTT CCACACTGATC	p000700	D	--
IM000659	GATCAGGCTGGCCTTGAACCTCACAGAGACC CACCTGCCTCTGCCTCCTGCATGCTGGGATT AAAGGTGTGTGCCACCACTGCCAGCTCAC AAAGTAGTAGTAGGACTAGTACTAGTACTAA TAATAACAAACATTACAACAATCTTAATTATTT TTGTTTCTACCTTTAAATCTCCCACTGTCT TTTTATATTGCCTCAAGTCTTCCCTCAGTCCC TGGCCTTCATAGCTTGACTTTTTTGCTAGAG GTTATCAGTGGCTCATCTCTCTCCTGAGATT GAGCTGGCTAAGACCACTATTCAGAGGGAG AATGTAATGTCTCAGACATCATAGCCAGTCC TCAGTTCTCCTTTTGCTGACTGACCACTTTGC CAAAGTAGTTTCTTAAGCCATACCTTTTCTT TTTAAAAAATAGTCTTTCTTATAGTGGGTGCT GGCTTTGAACTTCTGTCTCTTGCCTCACCTT GCACTGGTAGTAGAGGCTTGCAATTTACCG	p000702	C	-
IM000660	GATCAAGAACGAAACCCCTGAAAACATAAAA CAGTAAGATAACAATAGCGTGCCTGATTTTG TCCAAACCTTCTTGTACCTGTCACTGAGATT GTCAACTCCTTTTCAACACCCTACATACGTTA GTTAGCTCAGTTTACGAGAGTTTGCAAAGGC CCCCACCAGTACCCTGCAACTTTACCCACCC CTGCATGGGACTGTGAGAAAATGGGACTGG AGAGTAACCCTCTTCAGGCTCACAATCTGAG CTAGTCAGAGCATCTCACGGGTCCCGGGAC TTTCAGTGTGCTTTCTCTTGGGTATTGGACT TTAAACAATGTGTACCGATATGGGTGAATAAT ACAACATCCATGGAGAAATAAGCCAAATCAA GACACTTCTCAGAGG	p000703	D	-

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000661	GATCAAAAACATCAACGTAAGGAGCCCTTAA TGACGCTTTGTGACGGTTTAGAATGGTCTAC CCAAACCTAGCCAAGTCTAACTATGTTATGG AGGTGGTAAAAGCAGTTAACCTAAACATCTG GGACACTCACAGAATGATAGGTAGGTAGGTA GATAGATAGATAGATAGATAGATAGATAGAT AGACAGACAGACAGACAGATGTTGAATAAAA AGTGACGTTTACAGTGATGTTAGCTCAAGGC AGGGCTTTTCAGGCCATTTCCCCTGGTCTCA CCC	p000704	D	--
IM000662	CTACTAAGTCCAGAGCAGAGAAGGAGGCGC CGCCTGTGTGCACAGCGGAGTCTGGGAGAG ACCACCGGCCCAAACAGTAAACACAGGGC ACCCACCGTGCTCCGATC	p000706	D	--
IM000663	ACAGTAATCTGATTATCTTGACGTAGATAATT TGTCTACCTGTTAATGACTCTGCTTCTTGAAC TACGTCCCAGTAGATGCCATGCTTTCAGCCT GGTAAGTGACACTAATACTACCTCCAACTG TCACTTGGATTGTCAGGGTTTTGGTGTGGTG ATGATACAGGAGAAATGTAAAACACGGAGTT GATGATAGAAAGGAGTCACTAATACATTTTCT TAGGAAAAGTCAAGTGACACACAGCAGAATC TAGCTGAAGGAGCTCCGCCAATAGGGCTGG AAGATAACTCTCGCACTAACCTGCTTTATTAG GAACTGTAGGAAAGGCAGGTCTGCAGCACA GTTGAAGTTTAGGTTGCTGAGAAAGTTTCTG CTCATATTTATTACCAAGTGATGATC	p000708	D	--
IM000664	GTTTAGCAAGTCCGAGCGTGTTTCGATC	p000709	K	<i>Nmyc</i>
IM000665	AGGCAAACCCATGTGAGGCCTTCTCACATCT TTCCTTGGATGCCTGCACACCTGACTTGA CAGACTTCAAATCAGACTTATCAACTCACCTC TTCAGTCCTGGGCCTCTTCCTGTATTTCAATC TTAGATAGAAAATTGGTTCCACTGTCTACCA GCCTTGAACCAGGAATGCAGAGCCAACCAC CCCTGGGGTGTCCCAGGCAGCTGGGCTGGA TGCTACCTGTCATGCTCTTGATC	p000710	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000666	ATGTATGAGTGTGGGGCTGGGTTTGAACCTG TGTCACCTTAGGACTCTCTGAACCTCGGTTT CCTATTAGACGGAGGGGCTATTCGGAGTCCT CATCTAATGGAGACACTTTGTGGGTATCAGA GGGCAACACTGTGGTATTGGGGGTGGGGG TTGCTGCTTAGAGCTCAGAGAAGAGGAGTTT GGCTTGCTCTACAGAACATGCAGGCTGAGG TGTGGGTGCAGGGTTTCCCTGAGGCCCGG CTCTGACCCTCTCCCCACTCCATTTCTGCG CAGGTGAGCGACAAACGTTCCAACAGCTTCC GCCAGGCCATCCTTCAGGGAAACCGCAGGC TGAGCAGCAAGGCCCTGCTGGAGGAGAAGG GGCTGAGCCTCTCTCAGCGGCTCATCCGCC ACGTGGCCTACGAGACTCTGCCCCGGGAGA TTGACCGCAAGTGGTACTATGACAGCTACAC CTGCTGCCTCCGCCCGGTTTCATGATC	p000711	C	--
IM000667	GATCATTTTTCTCTCGAGATGGATTAAAGCTA TGCTGCAGAAGGACCCGTGTGTCTCTGTGT GTGTGTGTCTCGCCGGCGAGACTCCTTATC ACACATGACAGCTTCAAAGCCCCAGATTCA ATAGGTTCCAGGAGTTCACATTTAACTCAT GGGGTCAAAGTGCAGGCAGATGGTGGAGCC TGTGGAAGGTCATCAGACAAACCTGGTG GTTGCAGCAGAAATCACCAGGCAAGTAG	p000712	R	-
IM000668	GATCTGGCTAGCAGGGAGCCATTTACAGCTC AGACATCTATCATCCTTA	p000713	D	-
IM000669	GATCATTGTACCTCACCTGTCAGTTTGACAG GTGGGAGGTGATATCTCTTTTCATTCATGTAT TCTTTGAAAGTTTGTTTCATGCATATAATACAT TCTGGTTCAATTCACCACTCCACCCTTTTGTA TCCCCTGCGTACCGAGCCCCATTTTCTCAC CAAGTCTTACTGTTATCTCAGTTTTGGGGCTT AGTTTTTGTGTTGCTTGTGTTTGTGTTTTGA AACAGGGTCCCGTTATGCAGCCCTGGCCCT GAACTTGCTAAATAAACAGGTTGGCTTTGA ATTCAGAGTTCTGCACACCTCTGTTACCCAA GTGCTCAGATTAAAGGCGTATACTACCAC	p000714	C	-
IM000670	GATCAATTCAATCTATTGCAATAACCTGGTTT TTTTTTTCCGCAACTCCAAGATGGGGGGGGG GGGGCCCAGTCAGGAGAGGTTTCAACACAA ACGCACTAGTATTTACACACAGAATCTCCTC CACTGTTCTTCTTTGCTTTAAAGTCTTT GTTCCGGAATCTATAGATAGGGAGACAGATG GCTAGTCCCCAAGGCTGAGAGCAGAGGAG AGTATAAACAGGGAAGTCAAGGGGTCTGGG AGGGCAAGGTAAGGAAGCCACAG	p000715	D	-

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000671	CAATGCCTTCCCCGCGAGATGGAGTGGCTG TTTATCCCTAAGTGGCTCTCCAAGTATACGT GGCAGTGAGTTGCCGAGCAATTTAATAAAA TTCCAGACATCGTTTTCTGCATAGACCTCA TCTGCGGTTGATC	p000716	K	<i>Myc</i>
IM000672	TAGTATTCAGGAAAAAGGAACTGGGAAATT AATGTATAAATTAATCAGCTTTTAATTAGC TTAACACACACATACGAAGGCAAAAATGTAA CGTTACTTTGATC	p000718	K	<i>Myc</i>
IM000673	GATCAGAAAAACAGCCCATTTATTCAAGATTC AGGT	p000719	D	--
IM000674	TAAC TTCAATTTAATAATTATCACATGCTAGG AACTAAAGAGGTGCACAAAACAAACCAACAG TGGTTCCTATCCTGTCTAACAGAAGAACTA CAATTGTGGTTTGGGATGCCACATAAATGAC AGCAACGGGACCTACAGAAAATTAAGTCACA GAGAGAATGGACCATTCTGCAGAGACCTG GAAAACAGACAAGGGAAGAAACATGGTGTGT CTAAGTGATGGGGCAGGTGGTGCAAACGCT AGAGGCAAGCAGAGGGGATATGAACTGTG CTGCACAGCTGGACAGAAGGGAGGCTGGAA GGGAAGAGAGGACCCTCTGTTTTGACTCAAT GGCTAGATGCCATGTGCCAAATAAGAAAGCA CTTGGGGGGTTCTGTGGGAAATCGGAACAG AGGGACTGGAATCAAACCTCAACGTTCTTG CATACTCCAGATAAGAACCAGGCTTTGAGCC AGGGCCTGGGAAGAGGGCTGGCCTACATAT CTCATTTTAGAGATGAGCAAACAGGACTGGG AGCTCTAGGTCTTCAGTGACACGCTTGCTTG GCCCGCAGGAGACCCTGGGTTTGATC	p000720	D	--
IM000675	GATCATGTCTGTTGGTCAACAGAAATAATTCT GAAAGGCTAAGTCATTTCTTCTACCCCCAAG AAAAATCAAGAACCCCCACATTACAAACCTT CCGTAGTAACTGAGAATGGAGCCATGGCC AGAGCCCCCTCTGCTCTCCCATCCCCAACCA AGAACCAAAC	p000721	D	--
IM000676	ATATAACTTCTTTTTTTTAAAAAAGAATTATT TATTTTATGTATATAAGTTCCTTAGCTGTAT TCAGAGACGCCAGAAGAGAGCATCTGATC	p000722	R	--
IM000677	GATCATAGCACACTGGGGTGCCATCTGTAC CCCTAGACAAACATCTTTAACCNGCATCTCTT CCTGAAGCCCACTTGGACCACCTTTGAAA ACCATCACCAAGGCCAGTAAGGTACCCGTG GTGACTCACCTCAGCCTAGCCACCATAGAC GCTTAGCAGAGCAGGTGTGTGTAAGTCAGA GCCAGACAATCAGAACACTCTCCCTGCTCCA AAGTAGCAATGTAAAAAATTGAACCCAAAGTT G	p000724	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000678	GATCAAAGTAACGTTACATTTTGCCTTCGTA TGTGTGTGCTAAGCTAATTAAGCTGATTTT AATTTATACATTAAATTTCCAGTTTCCTTTTC CTGAATACTACGCTGTGCATTCTGTACAATC CCCAAACGTATACATACACACTTTATATATAC ACGATAATCTAGCTTATTAACCAACCAGAAAC ATGAGTCTTTTGCTCTGTGCATTGGTTCTAGA TTTATTATATAATGCATATCCCTCGGGATT GCTTATCC	p000727	K	<i>Myc</i>
IM000679	GATCATTTGATGCTTCAGATAAATATGTAAAT GGTGAC	p000728	B	<i>Mm.12788</i> 1
IM000680	GATCAAGATAATCCCCACAGGCATGCCAG AGGCCCATTTCTAGGTGAGACTATAGTCTG TCAAGTTGACAATGCTAACCATTGCAGTGAG GGAGAGAAAGAAGGCCAGGATGGTGCCTCT CTGTTACTCTGCTTACCCACGGGGTGAAGG ACAGTGGGGGATGGCCTGAGCTTCCTCAT GAACACACACATGAGAGCAGTCAGCACATG GCCTCTTCCTCTAAGCTTCACAGTGGCAGCC GCACCTCTGCTGTTAAGACCTAACATGTGGC CGGGCAGTGGTGGCACACGCCTTTAATCCC AGCACTCGGGAGGCAGAGGCAGGTGGATTT CTGAGTTCGAGGCCAGCCTGGTCTCCAGAG TGAGTTCAGGACAGCCAGGGCTACACAGA GAAACCCTGTCTTGAAAAACCAAACCAAAA CCAACCAACCAACCAACCAACCAACCAATCT AACATGTACATCCTATCCATGTGCACGAATC ATAC	p000729	R	—
IM000681	AGACCAAGTGCCGGAGCCGTTCTGGCTGAG GCAGCCCAAGTCCTTGAAGAGCTTGAAGAG GTCGCTGCGGAACCTGACGCCGATGAAGGC ATACAAGAAAGGGTTGACGCAGCAGCGGAC GGAGGCCAGGCTGTAGGTGACGTCATAGGC AATGTTGAGCTGCTTGTGGTTTCGCAGCTG CTATTGGTGATGTTGAAGTTGGCCACCGTCT GAGCCAGGACCACCCATTGTAGGGCAGCT GGAAGACTATGAAGACTACCACCACGGCAAT GATC	p000730	A	<i>Cmkbr7</i>
IM000682	CCCTCTCAAGCCTTCCTTGTACTTAGCCTCT ATAGGTCTGTGCATTATACCATCATTCTTTTA ATTTACAGCTAATATCCATTATATATGATTAT GTACCATATTTGCCTTTTGGGGTCTGGATTG CCCTACTCAGGATGACCTTTTCTAGTTTGATC	p000731	D	—
IM000683	GATCATGATGTTTGTGAAGCAACAGAACT ATAAGACAGTGCCCAAGAGCCTCTCTGGAGA TAGCC	p000732	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000684	GATCGTGTTAGACACAAGTAAGAAATGAATG AGTCTTCCTGATTTTTTAAATTAACCTCTCCC CATATTGGCTGTCACTACTTTTTAAATCAGAA AGGAGAATCTGGACGGTTCAGGCCTGCAG CGCCATGCTTGCAAAGGTTTACAGAATCGC TCTGGACAAC	p000734	D	—
IM000685	CTACCACAGCATCTTTTGAGTGTATATAGTCA GTGTGCTACATGTTATCTATGAACATATGCAA ATGAGGTTTGAGAAATTAAGTTGCTGATAGA CTCATGGGTTAGGGGTTTGATTGCCTGCTAA TGATC	p000735	D	—
IM000686	GATCACGAAACGGTTGACTAAAGCAAGACTG AACCACAGGCAGATACCAAACCCAAAGCTCT ATGTCTAGTGTCTAGAATACATAGGTTTGGG TAGCCATGCCCCTGTGACCCTGCCACCTGCA GCACACATAAGACAATACTATAGACAACCAC TTCTGAGTCAGAAATGCAATGATGTCTTTGG CAAACACTCTAGTCTCCTTTGGCCAGGAGC TGCTAAGTGGTTCAGGCTGAGGTACAATCAA CCTAGGTAGGTGGGACTGTGTGCCCTGTG CTCCTGGGTGGCCTTCATGTCTGCTATGCTT GCCCTT	p000736	D	—
IM000687	GATCATGTCAACTATACCTGGACACGGACCT TCATCCTTGCTGGTTTCACTACCTCTGGCAC CCTGCAACATCTTGCAGTTTTTGAACCCTG TGCATCTATCTCCTCACACTGGCAGGGAAC TGTTTCATCATTGTCTTGGTCCAGGCAGATTC AGGGCTGTCCACTCCCATGTAATTCTTTATC AGTGTCTCTCCTTCCTGGAACCTCTGGTATG TCAGCACCACAGTGCCACCTTGCTGCATAC CTTGCTCCATGGGCCTTACCCATCCCCTCG TCTGCATGCTTTGTCCAGCTGTATGTCTTCCA CTCCTTGGGCATGACCGAGTGCTACCTGCTA GGTGTCTGCTCTGGACCGCTACCTTGCTA TCTGTCTGCTCACTGCACTACCATGCACTCAT GAGCAGACAGGTACAGAAACAGTTAGTTGG GGTTACATGGTTGGCTGGTTTTTCAGCTGCC TGGTGCCTGCAGGTCTCACTGCCTCTTTACC TTATTGTTTGAAAGAAGTGGCCCATTACTT	p000737	C	—
IM000688	CTGTCAATTCATCCAGCTCTAGGCCGCTGTC TGGCTCGATGCTTATTGGTTTAACAGTGCCG ATGCATAGGATTCTACAGTCAGAGTGGCCTA AGCAACAGCTAAATATTGTTTTCTTGCTGTT TGGGAAGTAGATGTTCAAGGTCAAGGCGTCA GTAGCTCTGTTATGAGACCTCTCTGCTGTCG GGCTGTGTCTTCAAGTTTTTCCCCCTCTGT GCATGTGTGTTCTATTTCTCTGCATGAAA GACCAGTAGAGCCAAGTGGTGGCACACACC TTTGATC	p000738	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000689	GATCATGAGAGGCGAGAAACCCAGACATCT CTAACTCTTCTTGCCAACTCAGGAGCCACCT GTGGCCCCAGCTGGCCACCAGCCGTTCTC CCTCAGAGGCCTCCATTTCCACAAAAGGCCT TCCTGGTTGTTCAGGACAGAGCCTGGTTTCC CTGATACCCCTTCTCTCAGTGGCCACTGAAG TTACAGGGATGCAGCCAGCCGTGGTTGCCA TGTCTGTATATGCTAATCTCCGAATTCACCT CCTGTTTAGATTCTCAG	p000739	D	--
IM000690	GTTTGTCCGCATGAGTCCCAGGGACCACTCA GAGTGGCTGGCAGGCATTGTGGAGTGGAAT GTGGGAAGACACATTCCCAGCCTGTTTGCA GCTTGGGACTGTCTGTGTTTGGGATGATC	p000740	D	--
IM000691	GATCACCTGGGAAGGGGAAAAGGACAAGT CTGAGCTCCCAGCCACATTCTCCTAGGGTA GCAGCTCCCTCACTTAGTGT	p000741	D	--
IM000692	GATCAGTTCTTATTAACAATACAGACTTAGG CAAAATGAGTCAGAAATAAGGATATCGCATA TCCCAGAGACCATTGAAGTCTAAGAAGTATTT TCTATTATTAAGTAGTTACCAGGCAGTGG TGGCACACACCTTTAATCCCAGCACTCGGGA GGCAGAGGCAGGTGGATTCTCAGTTTGAG GCCAGCCTGGTCTACAGAGTGAGTTCCAGG ACAGCCAGGGCTACACAGAGAAACCTGTC TGGACAAACCAAAAAAAAAAAAAAAAAAAAA G	p000744	R	--
IM000693	GATCATCACAGATGACATAGAACCAAAGTGT AACTTTCTAGACTACATGTAGCAGACATTT	p000745	D	--
IM000694	GATCATACTGAATACAAGCAGGCTTCTGGT ATACTCTTAAGTTGAATTCTGTTTTCTGTAGT CGTAGTCTTGTCTTTCCAGTTTTAAATTCTA GAACAGGTATACTGTAGAGCACCCGCCTCC CCTTGCTCTGGAGGTAGGGTAGAGTGGGAG TTAAGGTCAGTTCC	p000746	B	AA657028
IM000695	ATTTCTCTTGTAAACTCACTTTCTGTTCAAC CATTTTGTCTGTGTCCTTACTAAATTATTTCTA TATAGGAATCTTTGTATCTTCTGATATAAGCT AGCGCATGGGTACCACCAGCACCCAAGTCA TCTGCTGAGGTGCTTCTAACCTTGCTTGATT CAGTGTCTTCAACAGAAGGTGGAGTAAACAG GTCATTTTTTACCCTAGAGAGTTCAGATC	p000748	D	--
IM000696	GATCTCCGGGTGCCAGACTTGCCAGCAAG CACTCTTACCTGCTGAGCCATCCTGAGGGCC TGGATTTAAAAAAAAAAATATTGACATATTG TTC	p000749	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000697	GATCTCCTAAAACTCCCTGTGTCAGGAACT TTCTGTGCTTTTGTATTGCGTTCCTGTGTTG TGGAAGGCCCCCAGCCTTCATCCTTGCTAA TTCTTTTGGATAGCTTGTGCTTTAACTAGA TTGGCCCTTTCTTGGCTAGTATTTCTGCTGT ACCTATGAGTGGTGTGGGAGAACTGTGCAG ACTTCCAGGAAGCGCAGCCATGAAGCTACAT GTGCCTATGTGTAGACACATCATGGATTTCT TACTAGTTTACTAGTGGGTGATAATCTGTCCT TTTGAGCTCTCCAGAACGTTCTAGAAGCTTA AGGAGAGAAATCACTTAAGAGAG	p000752	D	—
IM000698	ATCTGATAGTAAGTAAAAGGACAGCTAAAGA TGAAGGGAAAGCAGGAGAGTCCTGGAAGAA GAACTAGTGTTCCTAAGAGTTCATCATTGAT AAAATGCAAAGAAGTCAATTACATACATGTT TAGGAACTGAATCCTCTTGTGTTTGGGGGAT GTTTGTGTTGAGGCAAAGGCTCTCTTACAGA GCCCTGGCTGTTCTGGAGTTCTGTATATCAG GCTCTGGCCTCAAACCAAGAGATC	p000753	D	—
IM000699	ACATCAAGAGGAAGTTGGAAATGTCATCTTT AGCTATCTTATATCCTGGTAGCTTTAAGATTT CCTTTGTGTGACTTTATAGTTCTCAAAATATT TTTAAGGGTCAGGGGAGGAAGCACTTTCAAG AAATGAGATGGGAGAGGGAATGTCTTTGTGT TGGCCTGGAGATC	p000755	D	—
IM000700	AGCTATACCTGAAATTTGGCCAAGAACAGAA GCTCAGGAAATAGTGTGATTTAAAACCAAA ACCAATTTACAAAAGGAAGACTGTGGTGTAG ATC	p000756	D	—
IM000701	CCACAACCTGAAAGCAACACACACAGTATTTT TCTGTGGGTTTTAGGATGTATCCACACTCCC GAACTTCCTTTCCCTGAAGCACCCTCAGTT TACTCTGAAGCATGGTTTGAGTCCCAAGGCC AGTGTCAACTTTCTGCCAAGTCTCAATGGCA AAAGTCTGTTTAAATCTGCTCAGGCTAATGTA GATC	p000757	D	—
IM000702	CTTCCAGTCTTTTAGCTATTTATTGATATGA ATTCCCTGCCTTATGTATCATCCAAGATTCTA CCTAAAATACTTCCAATAAGTATCAAGGACCA CTCAAATATCACTATTGGACTTAGAAGCTCC ACTCTTAAAAATAGATTCTATAGAAAGAGCCT GAAATGGGGGCATGAAATGGGTCCATCTCC ACCATCACGCACACATGAACAAAGAAAAGGA GGAAATGGTGTTAAGAAAACCTACATCATACT ATTTAAAAATAAGGAGGAAGGAGGGAGGGA GAGAAAGAGAGAAAGCTCAATGCTTAGGCAA GAGTGCTTAAGAAAATTACAGTTAACAGATC	p000758	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000703	GATCTCCTAAAACTCCCTGTGTCAGGAACT TTCTGTGCTTTTGTATTGCGTTCCTGTGTTG TGAAGGCCCCCAGCCTTCATCCTTGCTAA TTCTTTTGGATAGCTTGTTGCTTTAACTAGA TTGGCCCTTTCTTGGCTAGTATTTCTGCTGT ACCTATGAGTGGTGTGGGAGAACTGTGCAG ACTTCCAGGAAGCGCAGCCATGAAGCTACAT GTGCCTATGT	p000759	D	--
IM000704	GATCTGAGTGCTGGGAACCAAACCTGGGTC CTCTGCAACAGTTTGTGCTCTTAGCTGCCGA GCTTT	p000760	R	--
IM000705	GTACGGCGATGGGCACAGGCTTCGGGACAG TCCGCGCGACGCTCAGGCGGACAACGGGA GGCGGGCGGGGAAGGCAGGGGCTGCAGTG TCAAGTCCCTGACCCGGGAGGCTCGGAAAC TTCAGTGCCTCTGCGCATCCGGCATGGCCC CTCCCACTCGGACTTCGTCAAAAAACGCCA CCGTGGAGTGTCAGTATGTGCGGTGTGG GACAACTATCGCACTGTTGCCCTGGCTCTT CTCCTAGACCCCCTTTGTGAGCCAAAGAGA AACGCTGGGCAGATC	p000761	B	Mm.27393
IM000706	GATCTCGTTACGGATGGTTGTGAGCCACCAT GTGGTTGCTGGGATAA	p000762	R	--
IM000707	CTGGGTTGACCTTAGAAACGGGAGTTCATCT CCTCCAGCAGCTCCGGGAAGGAAGGTGAAG GGGACTAACCATGATGAGCTTTGCACACTGG ACTCAGGGCCTGAGAAGGGGCTGGAGGGA GGCAGGGAAGACATCCCTCACGGTAGTGTT ACACAGCTGGTGTGCGGGCTGCCAGGGTA CTCATTTGAGTCCATGCTGAGTCTCTCGGTG CCTCCTGAGATC	p000763	K	Gfi1
IM000708	GATCTCAGGAGGCACCGAGAGACTCAGCAT GGACTCAAATGAGTACCCTGGCAGCCCGCA ACACCAGCTGCGTAACACTACCGTGAGGGA TGTCTTCCCTGCCTCCCTCAGCCCCCTTC AGGCCCTGAGTCCAGTGTCAAAGCTCATCA TGGTAGTCCCCTTCACCTTCCTTCCCGGAG CTGCTGGAGGAGATGAACTCCCGTTTCTAAG GTCAACCCAGAGTGGGAACCGCAGCAGCAG CAGCAGTCGTCTGTGCTTTGGGCTTCCCTA	p000764	K	Gfi1

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000709	GGAAGAAGTGTGTGCAGGCCATGGTCAAGT CCTGCATGGCTCCCATCTGGGTCCAGCAGC ACCCAGCCTCCAGTGCTTGCTCCTGATGTCC CAGTGAAGTCAGGTCCTGAGCAGCAAATCCC AGGGGCCAGTCCTAGGGAGAAAAAGAACAC ACTGCCATCTCAGTGCCTCAACAGAAGCAAA CCTAGGCGTCAGGTCATGTCCTTGTACCCA CATCACACCTAGACTTCCCTGGGTATCATGC TCTGTGTGAGATC	p000765	B	Mm.15351 2
IM000710	GATCTAAGGATATATCATTCTAGGAGAAAAT GAATATTTATGACCTTGGATTTGTCAATGTTT TTTTAAATATGGCATTAAAGCCACAGAGATAAA AATAAGAAAATAGATACATCGAATTTTCAGTAA AATGAGGAAGTTCCTTGTCATTCAACAGAAAC	p000766	A	<i>Mtm1</i>
IM000711	GAGGTAAGTCTGTTCAAGTGTAGCTATCCTTA GCAGCTAACAGTCCTCAAACTTTTTCAGAGA TC	p000767	D	--
IM000712	CTACAGATGCATTATTAATATTACTTTTTAAAA AAACCCAGTATACTGCTTGAAAACAGTGAAT GCAATGGGTTCTCATTACCTTCTGCTCTC AATCAATCTCCATCTCTAAAGCAAGAAGTGG GGGCCCTTCTGGCTGAGCGAGGGGTGAAGG GAGGGGAAGAGATC	p000768	D	--
IM000713	GATCTGGAGAAGATGTCAAGTTTTAAATGA GGCAG	p000769	D	--
IM000714	GAGTGAAGCAAGAATTTGGAGCCCAGCTGC CGCAGCCTTTTTCCTTTTCAGCAAAGCTCGGG AGTGATAGATATGCATGAACCAAAGCAAAGC CTTGAGAGTGCCACTTGGCCCTGCCTCCTGA GGGTCTCAGGGCATCAGCTGGAGACCACCC TGTGACCCACACATCACCGACTATGAAAACA GCTCATCAGAGTAATAAAGATC	p000770	D	--
IM000715	CAATGAACAGGACACATGCTTCACACGACAG TCCAAAATGCAAAGTGTGGAAGAATTCCAC AGCCATAGCCTTCATTACTAGATC	p000771	D	--
IM000716	ATGCCTTCCTGGTAGAAGAGGGCCATGCTGT GGCGGGGAGGGGCCACTCAATTTTTCTGCTC TCCCTTTCCCTGTCCCATATTCTCAGGAGCTT CTAGAAGCGTAGCCTGCATCTCATGCCCTGA CTTGGCACCAAATGCTTGCTTTGTATCAACA CCGCTTTCTCTCTGCTCTTCCAGCTCGCA GCCATTCAAATAATACCACCCGGTACCCGTG GAATCAGGAGCAGAGATTCCAAATTGAGTCC TAAAATCAAATCAAATGGGCCCGTCAGCTA GATC	p000773	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000717	AGGCGAGCGGATTACTAAGGACTGAAAGAC TCCTAAGACTTGTCTCCTGCTCCCTGGCCAG CGGTGGAGCTCAAGCAGAATTGCAAGCTCA GCTCAGGTCTCAGTGATGCAAAGCACCCCTC GTTACTCCAATGTGTGTTACTCCTACAGGTG GGCTGCCTTCCACTTTCAAACACCCGCACAA ACAGACCTCCCACCGTATGCCAGAGCATCTG TTCGATGCTTTCTGGAACTATGCAAGCCCA AATTTAATATCCAATCAGATC	p000774	D	--
IM000718	GTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTG TGTTACAAGGTCTCATACAGAATCCAGGCTG GTCTCAAACACTACTGGAGTCAAGCCATCTTCT CACCTGGCTTAGCTGGGGTCACAGACTTGTG CCATCATGCCCAATGGAATGCTGTTCTTTT GGAAAGCCTGCTACTGTCATATACTGTCATA GGAGTTAGCGACTGCTGGCTTATTCCTTCGC TTTGCTTGGAGATC	p000776	R	--
IM000719	CCCCCTTCCTGTCACCTCCTGACCCCTTGCG CAAAGGAGGCTCGTGGCCCGCTGTCCCACT GGGGGATGGGGCTGGGGTTGAGAAGGCTA GTGAGCGCCTCTAACGCTCAGGAAGTGAAG TTTGTGGTTTTGGGGGCTGAGCTCCGAAGGA GATTAATAAAAAAAAAAAAAAAGTCAGAGAGA CAGATC	p000777	D	--
IM000720	CTTTGTATAAGCAGCAAACAAAAGCCAGAG GCAGTCCACAGATC	p000778	D	--
IM000721	ATACAACAGGAGCAAAGCTGGAGGGGAACA GATATAGAGGACAGTTCAGGGCATCTGCAGA GGTGCTGTGGAATGGGGAGGGGACAGTGGA TAAGGGGACTTACCCTGAGCATCTCGGTAAT AAGCATGGGTCACACTGCGGAAGCGCTCCT GTCCTGCAGTGTCCAGATC	p000780	A	Rab37
IM000722	GATCTATGTCATCTTCCAGGACTCAGAGTTA AGAGAGTTACCAAGTGAGAGCTCTCATCACC TTCTGAAGCAGTTGAGAATTGGAACCCAGAA AGATGCACATGCACGGGCACACACACACCC ACGGGCACACACCCACCCACCCATGCAGAG AGAGAGAGAGAGAGAGAGAGAGAGAGAGAACT CACACTGGTACTGCAGTAAACGGGAGCTTGT TT	p000781	D	--
IM000723	GATCTTCTTTCTCTGCTCAATTAGTTCACCTC TGCTTTCATCTCCTTTTCTTTTGATAAACCAT GAGTTTCATTAGGGCTATTACAATCACATGC AGTTTTCTTATAGTA	p000782	D	--
IM000724	GAATTAGGCCTAGAAACATTAGAATCCAGAC CACGGAGCTCCCCAGATC	p000783	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000725	GATCTTGTTCTAGAACGACCCTGAAGGCAGC AGAACAGAGCAGGACTGAAGGCCACCAAGG GGATTTCAACTCTTCAGAAAAATAAGTGACT CACCTTCTCACAAGAGCAAGAATCACAGAG GTCAGATTGTCTCCTCCTGCCATCAGGGAC AGAGTCCCCCATCTTTGCCTTGCTCCATCTG GCAGGTAAGAGATGGGAAGTCTCCTTTCCCT CGGTCTGCAGCATCCCTGGCATCCCTGGGG AGTGTTGGCACAGAACCCCCCTCCCAA	p000784	C	--
IM000726	GATCTGTGTGGGCAAAGCCCCATGTGCTGCA GTGTGTCTGGGTAGAAATGAGTTGTGTGGTG CTCAAATGTAAATGAAGTCCCTGTGTT	p000785	D	--
IM000727	GATCTCATTACAGATGGATGTGAGCCACCAT GTGGTTGCTGGGAATTGAACTCAGGACCTTT GGAAGAGCAGTCAGTGCCCTTAAGTCTGA GCCATCTCTCAGCCCCCACCTTTTTTTTA AAAGATTTATTTATAGTTTTTGCTTTTTTAAC AGTACTGGAACATCTCAGTAATTGCTAAGTT GTCCTTGCTCCAGGTGAGCAGTCATATTTTC TCCAATTCTGGTTTCCTTACTTGTGTGAGAGA CCAAAATAGCTTGTTTAATCAGTTAGAGCTCT TTAGTTACCCATATCTGTGTAGTAA	p000787	R	--
IM000728	TAAGAACATAAAAGCAAAATTTGGAGGCTCA AGATTCAAGTTTAGTTGCTAGAGGGCTCACAT AGCATGCCCTCCCCACCCGGGATTCCATTCT CATTTATCGAGGCATAAGGCCAGGTGTGGTG GGATATGTGCTGGGATGCATAAGATC	p000788	D	--
IM000729	GAAAGGCACACTGGTGAAGGCTGAGGACCA CCAAAGCTGCATTTCTGCTAGGCTAGGTAGA ACAAGAATGGTGCTCCACTAAGAACTCAAAA AGCCACAGCCCACCCCTGAGGCCCTCCATC TGACACATGCCGGTCACCTGTCCTCCACAG CCCAGCACAGAGAAGCCACCATCCCTCCCC TTCCACCTCCTGCAGCTGACAGTGTGCATC TTTCCGCACATTCTCTCTCTCAATCAGGTC AGAATGTATTCCAAAGATC	p000789	D	--
IM000730	CACTGAAAATGGCTAGAATTCTGGTGATGGG TGAGCCGATC	p000793	D	--
IM000731	GATCGGAGTCCCTCGTTTCAGAGGCCCCACT TCTATGGCTCCTGCCTTCTTGGCTACATCC ATTCTGCTGAGCTCCTGGAAACCTGTGTAT CAAGTCTTTCCAGTTAGTGCGTTCTGAGTG GCTCTAGAAACCGCTTCCATTACAGCGAAA GACCCGTATAAACCATGTTCTCTTCTCTGT GACAAGAGACAACAGACACCGCACAAAGGA CTGTCTGGCCTGGGGGGGGTCCCTGGTTC ACAGCTTCAGTCCTGA	p000794	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000732	GATCGCTCAATATAACAGCAACATGCCAAGT GCCACTTGTAATAATTTGTTGTTGAGCAGTCTC ATTATCAACTGAAGCACAAATGTCAGGCTAGC AAGAGGCAGGTTGAGTTGTTGATTAGCGATA GCACACACAAGCCAGCACATGCTTTTCTGT GAGTTCTAT	p000795	D	--
IM000733	GATCGCTGAGTTTGTTCACAGAGCAGGGACG CCTCAGCTCGGATGCCAAAGCTACCAAGAG CTGCAAACGCAAACCTTAGCAGAAGCACACGT ACTCCC	p000796	A	<i>Cited2</i>
IM000734	GATCGCACAGGTAAATGGGGACTCACTTTA GCTAAACAACAACAACAACAGCCTGATGA GTCGAAAGTCTCTTTAGGTTGCCCTCTGTTT TCCAGCCCCACATCCTGAAGGCTGTGCATT CTCCACAGCAGTCTCAAAATAACCATAGTG CTCAAGTCCCCTGTATCAAATGGTGGTATCT GCATCCACCCTACAGGTGTTCTTTGATTCTTT CTTTTCTTTGTAAGTGTGTCTGGGTGTTTGC CTGAGCGTATGTATGCGCCTAGTACCTGCAG AGGCCAGAATAAGGTGTCAG	p000797	D	--
IM000735	GATCGTGAGAGGCGAGAAACCCAGACATCT CTAACCCCTTCTTGCCAACTCAGGAGCCACCT GTGGCCCCAGCTGGCCACCAGCCGTTCCCT CCTCAGAGGCCTCCATTCCACAAAAGGCCT TCCTGGTTGTTGAGGACAGAGCCTGGTTTCC CTGATACCCCTTCTCTCAGTGGCCACTGAAG TTACAGGGATGCAGCCAGCCGTGGTTGCCA TGTCTGTATATGCTAATCTCCGAATTCCACTT CCTGTTTAGATTCTCGG	p000798	D	--
IM000736	ACTGTCCGTGTGGGAAACGTTTAGCAAGTCC GAGCGTGTTTCGATC	p000799	K	<i>Nmyc</i>
IM000737	ATTTCTTTTGAGTACTTCATATAAGAGCTTC GCATCTACACCACTCTTGCTCGCCACTCCTC TTTTCTTCTTTCATTAAGTGTCCACTCTC CAAACCTCATAATCTCTAATTACTATTGTTA TTTACACACACACACACACACACACACAC ACACACACACACGTATATGTAACTACTGAA TCTTACTAAATAGCTTTACTATCTTCCAAGTA ACAGGCACTTGATAAATCTTCTGTCAATCTCC CAGAACAGAAGCCTTAAGAGTCATTTAAGTT CTTTTATCTCAGGCTGTTCTGTTCTATGCCTT TTGCTTTTAATCCATCACCGATC	p000801	D	--
IM000738	GAATGTCTAGATGGAGACTGGACAGAGTTG GATTCTAGACACCTAACAGAAGCGAAAGCA GGGATGGATAAGGTGGGTGCCTCGTCCTA CAGCAGGTTCTGAGTGTCCGCAGAGACTCC CATGGCTTGGCACCATGGTTGAAGCTTTCCA TCGATC	p000803	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000739	CTATTTTCGTTCTCTCCGATC	p000804	D	--
IM000740	GATCCTCATGTCAAGGCAGGGGCAGACCAG GGTCAAGGGAAAAACACCTGCTTTCCTGGGT TGTAATGCCAGAAAGGAAGGCACGGGGT GGGTAGGGTGGAGAACATGGCCAGACCCC TGTCTCTTCTCT	p000806	D	--
IM000741	GCACCTGACTTCCTCATATAAGACACAAACA TCTTGAGTGCTGCGCAGGTGTACCAGGATAC AGGTGAATCCAATCTGGTGGAGATTTGCCCC TGCTGCCCTGATTAGCTGAAGCTGCGTGCCT GGTGAGGTGGCATGGCCTGCTGTGCGTGGA TGGGAAGTGAAGTATAAAAGAGCGAGAGG CCCGGGTTAGAGGAGGATTATTATTCGAGAG AGGATTGTTATTATTGGGAGATATGAACAAG GGAGATATAAACAGGGGAGATATAACAAGG GAGATATATGGAGAAAGAAGAAACAGGACTG AATAAATGTGTGCAGAAGGATC	p000808	R	--
IM000742	GATCCTTCTCCTGTCTTCTCTTCTGGAAGGC TGGGCTACATGCCAACATGTCAGAGTTTAC CTGGGTTCTTCCAGAGGTTTGAAGTCAGGT CCTTGACTTACACAGCAGCTACTTTGCCTAT TGAGTCAATATTTTGTGTGTGTTTGTGTAGGT GTGTCATGTCTGTATACTTG	p000809	D	--
IM000743	GATCGTGCATGCATGGGTGTGTTTTGGGGA GAGGTTCTGTCCTTGCTAAG	p000811	D	--
IM000744	AGCTCAGCTTGTGAGGCCTGATTGTGAACAC TTCACCAACCGAGCCATCTCGTCAGCACAGC CCTGTTTTTATTCCCATTTTCTTTTCTGTATT TCTGTTGAATTTCTCACATACTCTCCTTCTC TTCTGCCTTCTTCTGGTTTCTGCATCATTTCT ATATTGACATTTAAACAACCCCCAAAATTCAA GATACATCAACAAAAATTTATTCAACTAGTCT TTCTTACTTCCATATCAATAATGAAAGAAAAT TAAACCTTTCAAATTCAACAAATCCCTACAC TACATATAATCACTTTCCTCTATGCTAAATCC AACTTGAAATTATATCCTCAATACCCTGCTGG TATTTTACTGTCTACATCACTGCCTAGTCTT CGATC	p000812	D	--
IM000745	CTGGTATATGAACGAAGTTGGTCTCTAAAGG CCGTCTAGAACAACGGTTCTCAACCCGAGG GTCGCACCGGGGTCACCTAAGACTACTGGG AAAGCACAAATATTTACATTACGACTCATAAC AGTAGCAAAATTACAGTTATGAACTAGCAAC AAAAAATAGTTTTATGGTTGGGGATTACCACA ACATGAGGAACTGTATTCAAGGGTCGCAGCA TTAGGAAGGTTGAGAACCACCGATC	p000815	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000746	TTCTAACCTGCTAGGGTTTTCTCACGTGGGT TCTTCTTTGAGGGCTCTCTGGCTTCCCTACT GAGCTGTAGCTGCCAAAGTTGAAGGGCTGC GTCTCCCTTGCGTCTCCCCAGTCTTTACAGC TCCTGAAACACACTAAGGTATTTATTCAAATC CCTGTTTTGTGTGCGATC	p000819	D	—
IM000747	AGGGCCCTTCCACCTCTTCTAGAATTCGGTA AGCTAAAAGTACATGTATCCGATTAATCTGAA ATAATTTTGTAGACAGTTTGGTGACGGGTGG AGGGTGTGTGGTTGCGCGATC	p000820	C	--
IM000748	GATCGGCGAGACCACGATTTCGGATGCAACA GCAAAAGGCTTTATTGGATACACGGGTACCC GGGCGACTCAGTCTATCGGAGGACTGGCGC GCCGAGTGTGGGGTTCGGACCAA	p000823	R	—
IM000749	TTGGCTGTGGAGATGAACGTGGGAACCGTG GAAATGACCCTAGAATGGGGCTCAAATGTGA AAGGCATGCCAGAGGTTGCTCTGTTGTTTTA AGTCCCTGCCGAACATTAGAATTTAGCCTCA GTTTTAAAAGCTGTTACTGCCTAGTTGGGTG CTTCTTTCTTAAAAAGCAACCAAAAAAAAAA AGCCGTTTTCACTCTGAAATGTATTAGAAATT TGCATTAGCCCAATGGCTAATAAGCGATC	p000824	D	—
IM000750	GTTATAAGGATTGCATACAAATGGCATCAGG ACTGGATGTGGTGGCACATGTCTTGATCAC AGCACTTGGTGAACAGAGGCAGGGGAATCT CTTTGAGTTACAGGCTAGCCAGCATGACACG GTGAGACTCTGTCTTAAACAAACAAACAAAC AAAAAAACAAACAAAGGTAGCATAAGAGCGA TC	p000825	D	--
IM000751	ACCTGAATCTTGAATAATGGGCTGTTTTTCCG ATC	p000827	D	--
IM000752	AACATAACCTTTCTTCCGCTGCGATGTTTC ATGAGACTCTGGGTTAGTGCATGGTCAGGG GCCCAGGCAACAGTGGCAGTTCTGCCAG GATC	p000831	D	—
IM000753	GTTTAAAGAGCCGGTTCGACCCGCTTTCGGT TTCGCTCCGGGTCAGCTAGTACTGTGAACCG CTCGGTCGGGTCCGGCGCTGCTGCGCACCT ACTCGCCGGGACCCTGAAGCCCCCACTA CATATAGGGGTCTTCCCGGAAAGTACGCAG GAAGTCGCGTTCGGCCCCCTCCCCCAGCA CCACACCCAGTCCCTTCCACCCCCCGGGAT C	p000832	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000754	GATCCCAGTAGAGACAGAAACAGTGCCTTTG GTTAAGAATTCCAGGCAGGATGGTACAGGAT TGCAATCTCAGCATGGGAGACAGAGGCAGG ATTTCCAGGCCAGCCTGGGCTACAGTATAAA TGGGACCCTGTCTCAAGTAATTGAAAAAAA ACAGAGAAAGAATTTGGAGACTGTGACTATA GCTTGGTGATGGAGTCCGTTTGCCTAGCAGA GTGAAGCAGCTGTGCTCCTGTGTTACACCA CAAAATAA	p000833	D	—
IM000755	GATCCAGTGAATCTGGGCATTGTGAGTGTGT GACACAACCTTGCTCTATGTGCTGTTAGGGAT TTGTGCATGCTCAGCCAACAACAACCGCCAA CTTAGACTGATGCTGTCCCCCTGAGAACACA GACTGACAA	p000834	B	Mm.13133 6
IM000756	GATCCTCCCTACCGGTCTCGGGCAGACCT CCAGCCCTTCCCAGACACTGTTGAAAGCA GGCACGCCTTCCACAGTATGGTCTGAGGTTA ACCCATGACAGCACTCTGGGTGCCTGGTGG TGTTCTGGTGGGGACGTCAGTAGCTGTAG CTCTGTCATTGGTCCTTGCAGCGTCTCATT CAACTATTCTCCCATCACTCCTCT	p000835	D	—
IM000757	ATATGTGTTTGTGCGTGTGTACATGTGCA TGCATGGCATGTATGTACCCATATAAATATGT GTATGTGTGTAAGTGTGATGTATTTTACA CAGCATTTTGGATTAAATGGAGAAGGTAGCT CAGATGTCAAGTGTGCCCTCCTGTCAGGAGA GGAAACCTGATGTGCCTGCTGTCATAACTCT GGTTTTGATAAATACAGCACGAGTGATTTTTG GCTGTTGGGTTTGCCGTGTATGGATC	p000837	D	—
IM000758	GTTTGCTTGCAACATTGTCATAGCTTAGTGAA CAGTATAGCATTGTTCTGGCTCAAGAAGCCC TGGTTCTTCAAAGCTCCTACTTAGATGAAATT ATTTGCATCACAAACAAAATTGTTTGCATT TTTTAGATAATGAAGGATC	p000838	C	—
IM000759	GATCCTAGGCCAGTCAGGGCTACCAATAAGA ACCTGCCACACACACAAAAGGAAAGCAAATT TTTGCAAAAACCTAGTCTCATGGTGTACG GTCTTTAAACATCTTGAGGGGCTCGAACTGG TGAGGTGGCTCGGAGGTAAGGGCTTTGA TGCACAACCTGAGTTCAACCCCGTGTTTTAA AGACTTTCTGCAATGATTCTGGTCTGCAGTC CTAGCCCAAGCACAGTCAAGGAGAGATTGA GGCTGAAACGGAAGAATGGAAGTTTGCATAA CAGCTCAGTGGCAGAAATAACAGGAGAGAC CTGACCTTAAAAACAGGGTGTAAGGTGAGAA ATGATGACAAATGACATCCAATTCAACTGTG CTACGAACAGCTACCTGTTTGCACACCCCAA ACACACACACACACA	p000839	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000760	GTAAGAGGGAATGTACTCTCTGCCATCGGGA CAGCCAGTGGAAGTCTCACCTGGAGTCTTG CCTCCACGAAGACTAGGATC	p000840	D	—
IM000761	GGGACTTCAGGGCATAGAGCTTAGTTCAGA CAAAACCAAAGTTAGCAGTCGCCTCTCTCTT AAAGACGTTCTCTCTAGCCGCAGATGACCTC AGAAGGGGCTCTGGGAGCCGACTCCCACCC TTCCTTCTCTGTTTACAGAATCTGGTTGGGCT GTGAGGAGCGACCCACGAGACGGGCTCCCT GTAGTGAGTTAGGCCAGTGGGAACCAACGA GGATC	p000842	D	—
IM000762	ACACACACTAACACACACTCACTCACACATA CTCACACACTCACACACACTGTCACACAC ACACACACACACACACACACACACACTTT TCCACCAGGATC	p000843	R	—
IM000763	GATCCCTGGATATGGCAGTCTCTACATGGTC CATCCTTTAGTCTCAGCTCCAACTTTGTCTC TGTAACCTCTCCATGGGTGTTTTGTCCCAC TTCTAAGGAGGGGCATAGTGTCCACACTTCA GTCTTCATTTTTCTTGAGTTTCATGTGTTAG CAAATTGTATCTTATATCTTGGGTATCCTAGG TTTTGGGCTAATATCCACTTATCAGTGAGTAC ATATTGTGTGAGTTCCTTTGTTCAAATTCAT TTCTATCACCATTGTGTGTATATGTGTGTGT GTGTGTGTATGTATATGACGTGTGTATGTTGT GTGTGTATATATAACGTGTGTATGTTGGGGG TCAAAGGCATGCTCATGCCACAGTGAATGAG TAGACATCAGAGGACAACCTTTCAGGACTCAG TTCTCTTGTTCTACCCTGTGGTTCCAGGACA CTAACCAGGTCATCAGGCATGGTGACAAAG GTTTTGACTCAAGGAGCCATTTTACATGCCT CATAAGAAGGGCC	p000844	R	—
IM000764	GCACTAGGAAGGAAATTGACCCGTGTTGTTG GTTTGTGTTCTGGTTTTGTTGGTGGTGCTTTT TGTTTTTTTTGTTGTTTGTGTTTTTGTATCAG GATC	p000845	R	—
IM000765	GATCCTGCTTTCTCTTTTGACACAGAACTT CTCCTGATTGACTCTGGTCCAGACATTTCTTT CAAAGGCAGAGGACTCTGGCTTAGCTGTGG ATGACTTCTCAGATGAAGTTCATTGGTTGCG ATTGGAAACGTAATCAGAGCAGG	p000847	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000766	GATCGCATTAGGGTTTTTTTATGGTTTCTCA TCTTCTCTTCAAATTAGCATAGAAGCCTCTTC CTAAAGAATGGATACTTAATTCTTAACCTGAA AATATCTTTTCTCTGTGTGTTTCTCTCCATT GACTGTTCGCTCTATCTATCTATCTATCTATC CATCTATCTACTGAAATTAATAAAGGGAAC GCCTTCTTCTTTCATTCTTGTTTGTGTTG TTTGTTTGTGTTTGTGAGACAGGGTTTCTC TGTGTAGCCCTGGCTGTCCTGGAACCTCACTT TGTAGACCAGGCTGGTCTTGAACCTCAGAAAT CTGCCTGCCTCTGCCTCCCAAGTGCTGGGAT TAAAGGCGTGCAACCACCACCACCTGGCTCT CTTCACTCTTTTAAACGATTTTGAACCTT TTTAGTGAGGTCAACATTGTGTACTCCAGTC CCACTCATCTTCTGTCCCTTCCCTCTTAGG CCTGCCTGTCTGGTACCTCACTCATGTTTGT GTATTCTCTGTGCTGAGCCTCTTCTGTGCTTT CCCAGCACATGGCTGCTGGCTCCAGTTTCAT TCCAGTCCCTTGATGTGAGCCTAGTTCAG	p000852	R	—
IM000767	CTCTCATGGCATGGGTCTCAAGGTCTGCCA TTTCTGCTCCATCTTTACCCAGCACATCCTG TAGACAGGACAAATTGTAGGCCGGAGGTTTT GTGGCTGGGTTAGAGACCCAGTTTCTCCACT GGAAGCCCTGCCCGGTTACAGGAGGTGACC AGTTTCTGGCTCCATGTCCCCATTGCTAGG AGTCTTAGCTGGGGTCATTCTCACAGATTCC TGGGAGATTACTCTATTTTATCTCCTTGTTCA AAGTGTTCCATCAGATATTAATTATTCTCAAG ATTCAATATTCTCAAATATTATTCTCAAGCTAT GGACCCCTCAAATTACAGATAGATTTTATGAA TGAAAAGTTGTGTGTTTGAATATGTAGTTGA GGGTGACTTTGAACTTCTGGTTTCTCTGTGT CTACCTTCCAAGTGCTGGGGTTACAGGTATG AGCCATCACGCCAGTTTCTGTAGCACTGAGG CTCAAACACAGGGCTTCTGTCTGCTAGGCAA GCACTCCACCTACCAAGCCAAATCCCCGGG CTTTACTGCATCTTTGTGTGTATATGTATGGT ATGTGCGTGTGTATGTAAGGATATATGTACC TGTGT	p000854	R	—
IM000768	GATCAACACCTGAAAAGTCGCGCCGCTATA CACATCCCTAATTGAGAAGTATGTGGAAGAT TCCATCCGTGAAATTCAATTATCATGCAAGC CAAGTGGAAGCGCTTCCCTGGGGAAGGAAC CCAGCAGCCGCATCAAACGACCCACCTG TCTATTTTATGTCAAAGAGTGAGAAGTCTG GGTGATGAAATAGAGAGCATACATCAGCTTA ATGAAAATTTCCAGGGTCCCTGCCTGTAAT GGGAGTCCCAT	p000858	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000769	GATCACCACCAGGGTGTGAGAAAAAAAAA AGCAAGTTAGTAGATGTTAG	p000860	D	--
IM000770	GATCTGACAAAACCTACCTGTTTTGAACACA TGTGGGACAGCAGTCTGAGAGAATCTATGAA TAAAATTCCTTTCTGAGTCTGGCACATTGGTA CAC	p000861	D	--
IM000771	GATCATTATACCCCAAATGGTACTGTATCTAT ATATACCTCAAACATGTCATGTTAAAGAAAAT ACTCTGTTGAACTAATTCACITGTTT	p000863	D	--
IM000772	GATCACAGGACTGAATCACATTTATGCCAT	p000864	D	--
IM000773	GATCATTTATTTACTTGTGTTTGGTGTTCATGT TTGTGGCTCCTTATGTAGTCTAGATATTAAC TGAAGTCTGAAGTGGAACTACCAAAGATTTT CTTCCATCCTCATCT	p000865	D	--
IM000774	GATCAACCGCAGATGAGGTCTATGCAGGAAA AACGATGTCTGGAATTTTATTAATAATTGCTCA GC	p000866	K	<i>Myc</i>
IM000775	GATCATCATGTCAAACCTGACACGTGACGAG ACAAATCTGTGTGCACAGAGGTGTGACATCC TAAAAGTACTAACAATACCGCTGGGCAGGGA CACACGCGGCAATTCCAGTCTGGTATCCAT GGCTCAAGCTCTGCACGGAGAGCCCGGCAC ACGGCAGGAGGGAGAGCCACAGGCTAAGGA GAGCAATGCTAATAACATGGCACCCGTGTT AG	p000867	D	--
IM000776	GATCTGGCTTCCAAGGGCCTGTACTCATGTC TACAATGCTCCTACACAGATATAT	p000868	D	--
IM000777	GATCAGCCTTCCTCCAAAGCTACCTGCATAG AAGAGACCTCTGCTCTCACCTACTCTCCTCT ACAGTTCAGCCCATATGGCTTCACCTGCATC CCCTACACACACACACAGACACACACACA CACACACACAAACACGCACACAGCACACACA ACACACACAACACGCACACTCACAACACAAA CACACACAACACACACTCACAACACACTCAC ACACACACACAACACACACACACAACACACA CTCACAACACACTAGTACACAAAGACTCCA ACACACACATTCCCATGCACTACTCCCTCAG TATCCGCCGCATTGTGTTCACTCATCCA CACTCTCACACATGTAGCACACACATCAT TCCTACACAGGCATGGACACACATGCTCC TATACAGGCATGCCCAGTACTCTCATGCA TGTTTGACGTTCCCAAACAGGTTCCACAA GGGTTTGGCAAAGTACATGCATCCTCACACG CTAATGCAAGCCGTCACACCCCATACCACAA GCATGCAC	p000870	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000778	GATCAGATGTGGAAATTAGAGAGAAGTTTT AACGGCTCATGCACATTTCTGAAACTCTTT GCGAGGTATACTGGTAGATAAATGAACATTG GTCAGACTCCTCTAGTTTAAACCACTCTCTTC CCCGCTATGGGGGGAGGCGAGAGGCATTTT TAAAGCTTATATGTAGTTGCAAAGTGTGTGT GGTGTGTGTGCATGTATGTGCATGTGGTGTG TGTGTGTGTGCATGTGGTGTGTGTGCATGTA TGTGCATGTGGTATGTGTGTGAGTGGTGTGT GTGCATGTGTGTGCATGTATGTGCACCGTGT TGTGTGTGTATGTGTGCATGTGGTGTGTGTG CATGTATGTGCATGTGGTGT	p000871	R	—
IM000779	CTAACATCTACTAACTTGCTTTTTTTTTTCT CAACACCCTGGTGGTGATC	p000872	D	—
IM000780	GATCATAAGGACTGTTAGCAGGCAAAGGCG CGTGCCCAATTAAGATGGCTTTCGTTCCA AGAGGAATACTCTGGCAAAGTCCCAAGCGCT TCGGAAGCCCCTCCCTTCGCTCTCCACCCC AGCTTGTATGCTCTGATTATCCTAA	p000874	D	—
IM000781	GATCAGGCTGGCCTTAACTCAGGGAGATTG ATATGGCCCTGCCTTCAGGGTGCTGG	p000875	B	Mm.83635
IM000782	CTTCTTTCTTTCTTTCTTTCTTTTTTCTGA GACAGGGTTTCTCTGTATAGCCCTGGCTGTC CTGGAATTCAGTGTAGGCCAGGATGGCTCA GTCTGCTTTCTTATAGAACTCAGGACCACCA GCCAGAGATAACACCACTCACAGTGGGCT GGTCTCCCCACATTGATC	p000876	R	--
IM000783	GATCACACACTTCACTGTGGCTTGCTCAACTG TGATTTGCTGATACAAGGGCTGTTTACAAGT CAGCTATAGCTCCGCATTGCAGCTGCAAC	p000877	D	--
IM000784	GATCACTAATTGAGAAAATGCCCCACAGCTG GATTTTCGTGGAGGTACTTCCCCAACTGAAGC TCCTTTCTCTGTGATAATTCCATCCTGTGTCA AGTTGACAGAAAACCAGCCAGTACACAAGTC GACACAAAAGTAGCCAGTACACAAGTCAACA CACAACGCGCACAAAGCTGAAGGCAAAGAGA ACCAAGCATCTACCAGGCCTCAGTTGCTATG TCCAATTCTGCAGCCACTCCAAAACACCTGT CAGAAATTCGTTTGATAGAGAACTCACCAG GGGATTTCCCTAACACCAGGTCAACCAGGG CACCTCAAACCTGGAGGCACGACTGGCACA ATACAACCTAA	p000878	A	Cct5
IM000785	GATCACTTGATAAAGATGCTCTGAGCAGAGG CTCACAGGAACCCAGCCCTGTGTGCTCCCC AGGAGCGAGATTCAGCAGTCAACAGTGCAG TGTTACGTGACCGTGCGCAGGCCATGAGC ACTAC	p000879	B	AI615991

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000786	CTCCTTTTCAGCAAGCTCCTCACATCACAGG CCTTCTCTTGGGATGGCAGCCGCCTTCTATC TGGAAAGTATGTGACAGCTCACACAATCCTG TAAGTCTTCCATGTAATCACATTCCACTGCCT CTCTCTGAACGTGCTCCATGCCAGGGCCATG TGGAGGGAGCAGCAAGACTTGAGCTCAGCT AGTCTATGAAGATGGTGGCAGAACAGGCTCT GCTGCCTTGATC	p000881	B	MMU7675 4
IM000787	GATCAAGAGTTCAAAGTCATCTTCAGCTACA AATGAAGTTGGAGACCAATCCAGACCCTCTC TCAGAAAAAAGGAAAAAGGAGAAAGCAAAA GGAAAGGAGGGGGAGACCGAGAAAGAGAA GAGGGAAGGAAAGGGAAGTCAACAGAACTC AAGGTCAGCCTGGGAGGGTGAATGAGGCAT TGTTGTCT	p000882	B	Mm.13880 9
IM000788	GATCACCTCCACTTTATGGTGGACAGAGGAT GGCAGTAGTAAGTCCCCAAGGAAACAGAA ACAACAACAACAACAACAACACCTCCAA AAAGACCAAAGCAGTAAGCTGTAGAACAAAT GCAAAGAGCCAAAC	p000883	R	--
IM000789	GTTCCACCTATAAGGTTGCAGACCCCTTTAG CTCCTTGGGTACTTTCTCTAGCTCCTCCATTG GGGGCCCTGTGATC	p000884	R	--
IM000790	GATCACATGGACCGATTGCCGCGGGACATC GCACAGGAGCGTATGCACCACGATATCGTG CGGCTTTTGGATGAGTACAACCTGGTGCGCA GCCACAGCTGCATGGCACTGCCCTGGGTG GCACACCCACTCTGTCTCCACACTCTGCTC GCCCAATGGCTACCTGGGCAATCTCAAGTCT GCCACACAGGGCAAGAAGGCCCGCAAGCCC AGCACCAAAGGGCTGGCTTGTGGTAGCAAG GAAGCTAAGGACCTCAAGGCACGGAGGAAG AAGTCTCAGGATGGCAAGGGCTGCCTGTTG GACAGCTCGAGCATGCTGTCGCCTGTGGAC TCCCTCGAGTCACCCCATGGCTACTTGTGAG ATGTGGNCTCGCCACCCCTTCTCCCTCTTC ATTCCAG	p000885	K	Notch1
IM000791	GATCATACGCAATGATTTCTTACCTTATGATA TAATTATGTTTAGAGGGAAAACTTTTTTTAA ATTGAAGTTCATTTATTGTATGAAATTATTTCA TAA	p000886	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000792	GATCAGCATGGTCTACAGAGTAAGTTACAGG ACAGCCAGGGCTCCGTGGAGAGACCCCTTG TCAGAAAACAAACAAACAAAAATTAGAAAGA GACCCTCTCTCTGATTGACCAATCACCCGT GTCAAATCTTGCCACAACCGAATCACCACCA AATTGCCAGACAAGCGGCTATGCTGGGTTTC TGAGGTTGGACTCCTCAGGTAGCCCGTGTCT AGGCAGAATGATGCCAGCAGCTACACTTTTG AGAACAAGGTCAGGTCAGGACTTGCCGCCA AACCTAGGAATGCAGC	p000887	R	—
IM000793	GATCAGTCATGTCCTTTAGACGTTTACTTTCA TCCCAACTTGGAACATTTCAAGC	p000888	D	--
IM000794	TTACAAAGGCAGAAATATCAGAAAGAGCCTG AAGTAGCAGCTGTTAACCTGTACCAGGAAGT GGCCGAAGTACACACGCGTTAACTCAGCCC TAATTATTCTCGGGAGATACAGTTGATTATCA TACACATGTCAAATGGAAAATAAATGGGTA ACTAAAAATTGAGGAAAATAAGATTAACTT AAACAACCTAGTTCATTATGCCACGGTGATC	p000890	D	--
IM000795	GATCACAGTGGGACAGATTAATGTGA	p000891	D	--
IM000796	AAACAAATACAAAGTGATAATTGTGTGACATC TGAACCTGTCAATGAGATAGGTAATTATCTCT GGGCAATGGGTAAATGTGCTGGCCAGCAAA CCTCACAGCCAGAGTTCAATCTCCAGGAAGT TAGGTGGGGAAGGAGATAACTGACTTCCAAA TGCTCACCCCCAAATATACAATTAATAAAAA ATCTTCCTTTTATGAGTAGCAACTGATC	p000892	D	--
IM000797	TACCCCTGGTCCTCCAACACTCCGATC	p000893	D	--
IM000798	GATCATGACATAGACTTGAGTCACTTCTCTG CAGTTTGTCAATAAAAGCCCTAAGGGACAG TGTGGACTTTAGAGATAAC	p000894	D	--
IM000799	AATGCCAGCCATAGTGGCACACACTTTTAAT CCCAACACTCAGGAGAAGTTAAGTTTCTCTT AGCTCAAGGCCAAGTAGCTTGGTCTACTCCG TGAATTCCAGCCCCAACTACATAGTAAACTA GCCTTAAAAAAAAGGCACAGGCAGAGGGA GATAACAAAAATGCCCACTCCTAGCTACAG TAACTGTAGGAATTAAGATAGAATCTGTAGTT TGTTTATCATTATCGTGATGATC	p000895	A	<i>li</i>
IM000800	GATCATGGCTTGATTGTAACATTATCAAAGCT TCCTTGGCACACTGCAGGGCTGTCTTCGGG AAACTGCGTATTGTGCTCTTCAGGTACAAAG CATAGAGCCCTTACATGACAAACGCTGGGGT TAACTTCTTCTAGTTCCCTCTGCCCCACTTGT GGCGCTTCCCACTCATGACTTCTTCAGTGTG TATCACTT	p000896	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000801	GATCATGCTGAACTCTTGAAAGTATTCTAGC AAAATGTGGCTTAAAGAAAGAACAAACATTA ACTAGGTATGCTTTGAAAAATTACCTGTGGTA AAATTTCCACAAGCATGAGAAGTTGTTCTTT TGTTGAACCTTCAGAC	p000897	D	--
IM000802	GATCATATATCAATTTTATTTTAACTTTGTTT GTTTGTTTGTTTGTTTGTTGTTTCGAGACAGG GTTTCTCTGTGTAGCCCTGG	p000898	R	--
IM000803	ATTGTGTATCCAGAGTGTGACAAGGTATATA TGGTTGTGTGATC	p000899	D	--
IM000804	GATCTTCTGTCTGGAAGAGTGCTTGCTGGTT CCGACTACTTTTTTTTTTTTTTTTTTTTTTTNG CTTGGGTTTCANATTGGCTTCAGGTTCTGGG CCCTTCGTGGGTTGTGCTGCANAGCCCCAN ACAATGTCTTGGG	p000900	R	--
IM000805	CAGGAAACCAGGGGAAATGGGACACAGTGA CATCTGAGTCCTTAGAAGAGGTCCCACAAAG GTCTATATGACCTAGCAACGTCACCTTGAG TTATTTCTCAGACACAGTGGATGTTTGTCACA GCACACTGTAGGACATCCCAGAACAGCACC ATGGGAGACCATGGTTGGTGCAACAGAGAA CATGCACACTGAGACAGTACAAGAGTTCCCA AGCAAGCAGACACAAACAATGGACTCAATAC ACATACAGTGGCAGATC	p000902	C	--
IM000806	GATCTGCTCACCAAAAATCTTGTCCTAGGGA AGTTGAGTTTGAAGTGCCTGCTTACTGGCAA ACACGCGGTGCCCAAATTTAAA	p000903	D	--
IM000807	ACAGTTCCCCCTGGAAATGGTCCCTGTACCA GAGGAGCAGATC	p000904	D	--
IM000808	CTGGGGCCCAGACTCCAATCCCGAAATATCA TTAGCTGCTGCGCACTTCTCCGAGGAAGTTT ACACCAGTACCCTAAGTTCAAGTCTCAGAAG CCTCCAAATCCTCGTTGCACCCCTATATTTCA CTTGGTCATCCGACTGTAACCTCACTCACCGA CAAGACAAAGAATATCTTAGGCTCCGTCGTA AAAGAACGAGCCCGGTTACCGCAGCTCCT TTTATAGTCTCCTTTGTGCGAGATC	p000905	B	Mm.21798
IM000809	GATCTGAAGATATTTTGACAACAGCTAAAAA AAAAAACCAAAAAAACCCCTTATTACTAAC CAAGGGAAAAATGCAAAAATAATTAAGTTTC CTCAATTTTAAGTAAATATCCAAAAAGATTGG TTGTATAACAAAGTTGAAGAGTCAAACAGTAT TTGAATAA	p000906	D	--
IM000810	AGCTCATTGCCGTTAATTTTCCTCAGCCTAAT GAGAATCTAAGCCTTGATTGTATGTACCATA GCATCTAGATC	p000907	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000811	CCTTGAACCTAGTTCAGGGAATAGGCCACCT GGGTGGGACTAGTGCTGGTTGGGGATGAAA AGACAGTTGGCTCAGGTGAACCCTGCTCGC ACCCCTGGTCATCCTCTGAGACTGCTTTGATT GCTGACCCCAAGTGCTCCAGCAAGAACTTGC GTTCTTGTCTCTCCACTCAAGCCGGAAGAA ATCTGAGGAGAGGGTGTGAATCCTGAGCCA GGATGTCCAAAACAACGGAGTTGAGCCAGA AGGACGTCTAGTTGGGCAGAGTTAGCTCAGT CCCTGACCCCAAGTCCGTGCAAGCTCGAG GGTGTTATATAGTGATACAGATC	p000909	D	--
IM000812	GATCTCTTCTTATCTCTACCTTTTGGGGCACA ATCTTATCTGGGGACACCACAGAGCCCAAGA ATTGTCCTGTATCAGAAATTTGACCTTTTCT GTGGCTATCTGTAAACCCCACTGACTTAAAG TTTTAAGTAGAAAAGGATATGCCTTTGTAGC ATGGTAAGGTCTTTATGGCACAGGAGGATGT CATCCATGT	p000912	R	--
IM000813	CTTCCTTTCCTTTTTTGAACAGGGTTTCTCT GTGTAGCCCTGGCTGTCCTGGACCTCAATCT GTAGACCAGGCTGGCCTCGAACTCAGAGAT C	p000913	R	--
IM000814	GATCTGCTCCACTTTACACAGCTGACCATGA GACCATGTNCACATAG	p000914	D	--
IM000815	ACATGACATATCACCTCATTGAGAGTTCAG AGTCTTCAGAAAACCTGGGCGCCTGAAAAACC TGACCTTTTAAATTTTCGTCCATAGTTTCTTCT GTTGAATGAATATTCATTTAAAAGCTTCATAA ATGCCAAGATC	p000915	D	--
IM000816	GATCTTCACAGCGCACCCAGGGATC	p000916	D	--
IM000817	CTTTTCTTGGTATTTAGGGAGTCAGGAAAA GAAAAACATTGGGTTTTTACATTAGCTTTCA GGTAGGGTTGTGGCTTTTGAGCAACAATAAC GTATGACCTTGTGGTCGGTTCTAGATC	p000917	D	--
IM000818	GATCTTCTTATATCTGGTTTCCTGGGCGCTTC CTGGTAT	p000919	D	--
IM000819	GATCTCTGACAGGGTTTCAAAGAACTGTTAC TGATGTTTAGATTGCCTCTGAAGACATCACAT ATACTGTGCTACTCTGCCTTGTGAGAGTCCC GGGCCCTGGGCACCCAGACGGCAGCAGA GGAAGAGCGGGGTATCACTTTCTATACTTCG GTAAAGTCATTGGGATATGTGCCCT	p000920	C	--
IM000820	GATCTCCTCTATCATTTATCTTCTTCCTTCCT TCCATCTGTTTGT	p000921	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000821	GATCTGCTCACCAAAATCTTGTCTAGGGA AGTTGAGTTTGAAGTGCCTGCTTACTGGCAA ACACGCGGTGCCAAATTTAAGGAGTGCCAA CGACTTCGCGGGCCAGCAAGGTGAAACCGG AGCGCGCACGAGTGAGCAGTGGCCAGGAG GCCTGGCCAAGAGGCCAGGGTCCCTGAGCA TGACCGAGAGCTGGCGTGCTCTGTAAACC CCCAATCAGTTCACCTAATCTCGGGTCGAAA CCTGAGCCCTGCAGGAGGCGGGGCTGAGA CTGCATCCAGCTCCTGGCCCGCTCCAGGG GCGACCC	p000922	D	—
IM000822	CCAGGCATCTCCATTCTTAATCCAGATC	p000923	D	—
IM000823	CATAGACTCTTTCATTTAGAATAAAGTGTTC ACCTAACATCCTGTAGGAAGTGATGAACTA AAAAGAAAAATAAACGCATTTTCTTTCTCT CGTTACTTTTTCCATTCATAACAAAATTGA CTTTTTTTTTCCATGAGAGTTCACACTGGGT CTGCCTCAGTAAGAGTCACACTGTTAGCCC ACACACGCTGTGATATGTTATTTACTCATTCT CTTCTCAGGAACCACTCTCACATGTGAACCC TGAATACCAGCTCCCTCCCTCTTCAGATC	p000925	D	—
IM000824	ATAGGTTCTGTCTCAAACAACAAAAACCA AAACATGTCCACAGGGTCCAACAGACACAGT CTCCGCCACTCACAACTAATGGGTACACAAA TACACACCTCAGCCTTACATGGTTACAGAGA GAAGCAGGACCACAAGGTAGGCAGGCACCT AACACTTGCTTCTTGGAAGTTGGAGCACACA CACACACACAGAAACACACACACACTTTCTC ACACTCACACACACATTCTCTCTCTCACAC ACACACACATGCACACATGGTCTTGTAAG CTCCTCCTGGGATGGGCACACACAGGGGTA AGAGGACTCCAGATC	p000926	D	—
IM000825	GATCGAACACNCTNGGACTTGNTAAACGNTT CCCACACNGACAGA	p000928	D	—
IM000826	GATCGTCTGGCCCGACCGCGCTCAGTAGA TTTGGGTCCTGGTCTGAGCAGCCGGGCTGG TGCGGGTGTCTCACTAGGATAATGAATACA GCTCCACTACCTATACTACCAAGACGACCC CTCACACGCTCTGCGAGGAAACCGGTCTTC GGAC	p000930	D	—
IM000827	GATCGACCGCAGATGAGGTCTATGCAGGAA AAACGATGTCTGGAATTTATTAAATTGCTC AGC	p000933	K	Myc

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000828	AGTAGACTGAGATTTGTGAGCGCTAAGATAA AGATGAGCAAAGCTTTGGCAGCTCTTAGGTA TCTGAGGGCCACCGTCTCTACAAAGCAAC GAGAGGCACGGCGGATTAGGATAGACTGGT TGCATCCAAACACTACCTTGCTGCCTCAAAG GCTTATTGGACACCACAGAAAGACCTCTGCT GGAGGCAGAAGTCACAGGACTCCTCGTCAC AGACGATC	p000934	D	—
IM000829	GATCGGCCTTCCTCCAAAGCTACCTGCATAG AAGAGACCTCTGCTCTCACCTACTCTCCTCT ACAGTTCAGCCCATATGGCTTCACCTGCATC CCCTACACACACACACACAGACACACACACA CACACACAAACACACACACAACACACACAAC ACACACAACACACACTCACAACACAACACACA CACAACACACACTCACAACACACTCACACAC ACACACACAACACACACACACACAACACACA CTCACAACACACTAGTACACAAAGACTCCA ACACACACATTCCCATGCACTACTCCCTCAG TATCCGCCGCATTGTGCTCACACTCATCCA CACTCTCACACTTGTAGCACACACACATCAT TCCTACACAGGCATGGACACACATGCTCCTA TACAGGCATGCCAGTACTCTCATATGCATG TTTGACGTTCCCAAACAGGTTCCCAACAGG GTTTGGCAAAGTACATGCATCCTCACACGCA AATGCAAGCCGTCACACCCCATACCACAAGC ATGCAC	p000937	R	—
IM000830	ACACCACATGCACATACATGCACACACACCA CATGCACACATACACACACAACACATGCACA TACATGCATACACATGCACACACACCACTCA CACACATACCACATGCACATACATGCACACA CACCACATGCACACACACACACACCACTGC ACATACATGCACACACACCAACACACTTGT CAACTACATATAAGCTTTAGAAATGCCTCTCG CCTCCCCCATAGCGGGGAAGAGAGTGGTT TAAACTAGAGGAGTCTGACCAATGTTCAATTA TCTACCAGTATACCTCGCAAAGAGTTTCAG AAATGTGCATGAGCTGTAAAACTTCTCTCT AATTTCCACATCCGATC	p000938	B	Hs.170434
IM000831	GCTGGACCCCGGTGACAGACTGTGCAGATG GATC	p000939	K	<i>Pim1</i>
IM000832	TTAGCAAGTCCGAGCGTGTTTCGATC	p000941	K	<i>Nmyc</i>
IM000833	ACTGCACACATTGCCGGTTGTCGATC	p000943	K	<i>Notch1</i>
IM000834	CAAGTGTAGACATTGCAGGAAAAAATATGG TGACAGTGAACAAAGCCCGTGAAGGTGACA AAAGCCAGTTAAAGTAGGACAAGGCAGAGC GAGGCCCATGACCGGGACCAGGCCCAAGAA AATAAACGAAGGCCACGATC	p000944	B	AW321468

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000835	GTCGGAGGAGCTGGCTGGACCGGTACATGC CCTGGCCATCCAGGCCAAGACCCCCGCCCA GTGGAGAGAAAACCCACAGTTGGACATTAGT CCCCCTGCCTAGGTGGGAGCAAGAAACT CGAGGGACCTCTTAATAAATACCTGGATTGG GAGAACGATC	p000946	R	--
IM000836	GATCGCGGGGCTATCTATAGAGTCCCCGGG ATGTCTGAGAAATCAGCCCTAGAAATGACTA GAAAGAAAATCGAAGTATTCTTGGCTCCTGG AGACTTCGCAGCGAGAAGTCACAGATTGAG GACACAGATTGACAGGAGCTGCGGGCGCTG GTAG	p000950	D	--
IM000837	GATCCCAGGATTTGGGAGGCAGAGGCAGTT GGCCCCA	p000953	R	--
IM000838	CAGGCTGGCCTCAAACCTGCAGAGATGCTC CTGTCTCTGAGTGTTAGATTAAATAAGGGG TTCACGATC	p000954	K	Lck
IM000839	GTTGCTGGGCCCTAAGCGCCACATTTACA GCTCCGATGCTCATCAGCATGACTCTCCTGA GCACATTATCTGGTGGTGGCTGACACTCTCT TCAGTACCCCCCCCCCTCCCAAAAAGAAAA AAGAAAAAAGGACTGGTTGCTAAAAGAAAGT AAAAGTCAAGTCATCAAAAACATGTAATATC CTGTGTGAAAGTCACGAAGCCTTGCGGTTTG AGTCCCTCGATC	p000955	D	--
IM000840	GATCGGCCGGCTGTCCAGCGACCGGAGAAA GGAGAGCACTCGAATCGCAGAAGCTATCAG GTGAGTCCGACCTCTCTCTGAATGAACGCTT TGGGGAGCCTGCCAACGGTGACCAAATTTA GCCAGTTAAAAGTACAGGCTGCCAGCTGTA AACGTACATCAAACAATGTGCGATTTTATTTT TAGTGTGAA	p000956	D	--
IM000841	ATAGTAACACTTGGGAGGAGCCATTCCCAGT GAGGCTCGTATAGCATAGCCCTGTCCAATAG AGCCTCTGTTGCACTCTGTGTACACTTAGCT CCTTGCTTAGGGATTTTTTTTACATGGGTGAC TACAGCACCCCAATTTACATTGGACAGACT CCAGGACACCCCTCGGTGTCCTGTGACGCA TACAACAGCCCCCACGGGGCTGCACCGAA AACGCCACAGTACTGAGGCTGCACCTCACTC ACTCACACACCTCTATGGCTCAACGTCCT GGAGAAAAGGCTGCGACAGATTCCACATCT GGGAATGCAGTAAAAAGCACTCACACTGG GGGTGGGTGGGGCTGGGGGGGCACCCTG TCTTCCCGTCTTCCCATGACCCTTTCCTTC CAGGAGACCATAGCCAGAGCTGACAGGAGA TTCAGTCGAGCTGCACACGCTGCTGCCTTG CCGATC	p000957	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000842	GATCGGGCAGGACACACATTGGGGAGGCCCC ATCAAGCCCGAGCCTGCCTTGTGAGCCCCC GGATTGGCAGGGCAGAGAGGAAAGCTGCTG CGTGCTTTATAGACTTTGGGGAAGTCACAGG CTCCGCTTGCTTGGGGGAGGCAGGAAACCC CCTCCACCTAGGCGTCTGCCAGAGCACCCG CAGGCTTCCTCTTGTCTCTGTCCCCCTCCCC AGCACCTCTTCCCCTGAACAGCTTCCCTCTC CTGGCCCTGCTGTCCCTTTAAAGGAACTTGA ATCAGAGTTGAGAATGATGGTGACTCAGGGT GGAAGGGGTGGTCACTTG	p000959	D	--
IM000843	CCAGGGCTACACAGAGAAACCCTGTCTCGA ACAAACAAACAAACAAACAAACAAACA AAGTTAAAAATAAAATTGATATACGATC	p000960	R	--
IM000844	GATCCAGGACATGGCAGAATATGGTCATCTT CTTTGCTTGCATGTCACACGAATGGCCTCTG GCTCCACCCCTGATTGCTTGCTCCCCTTGA AGCCTCTTGAGCCTAGCTAACTTTTCCTGTT ACCTTTGTATTATGTGCTCCCACCATGGCCC ACCAGGCTCTGCTTGCAGCACTGCAGCCTG CAGCTCCAGCGGCCCTTACATGGCTCCTGTA AACAAGTCCCAGAGGCCTCAGTGTATCATT TCAGCAACCGCCTCACTTCTTGGTGCCGCCT TCCTTTATTACTTTTCATATTTCTGTGACCGAA ATACCCCCAAAGAAGCTACTCAAGGAAAGCA GTATGTGTGGGCTCACCATTAGAGGTGAGTC CCCTGCAGCAGTGGAAGCATGTGCTGGTGA CGC	p000976	D	--
IM000845	GATCGCTACTTTTTTCAGAGACGCCTTCATTAA GGGGAGAATGGAAAGATGCTGGTTGACTTG AAAGATTTCTCTCTGATTTGTTTTACAGGAAG TGCATTCTGTACACATGAGAGACTCCGGGTG GAGAGGCATTGTGGCGGTTGAGATGCACCT GGGAGTGCCAACTGCCCCGCTTCTACCAC AGCTCTGCATAGCAGGCTGGAGCAAGCAGC CAGCCAACCATTGTGCCCTAGCCTCATCTCC TCCAGAAGAGGTTATCTGGGCTCTGTGTAAC CTCTGCTCTTTGGCTATGGTATTCCTTCTTGG TGCTTTCTGTGGTCAACCTCCAGGTACACTT AGGGCCTATCCTAGACAGACTGGGAAGAAA GAATGACATTCCTTACCTCTGTTTTATT TCCTGGAAATCCAGACCTTGTTCCAGTTAGT GGAGCATGGGGTTAGACCAACCACACTGCT AAGAGTTTTGGCCTGTAGACATATCTGG	p000983	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000846	TAGCAAGGTAAGTACTTGTCTCAATTTCCAG GTAGTATAGAAGAAACATATATGTTACAGCTT TAACACCAGAACAATCACACAGTGTGTATTT TAGCTAAAATATGACTCTGTGGTTTTCAAATG GCATAGTTGTGGACAACCTAATTAAGCACGC TCTTATAAGACGTGATAGAGTATGTGCCATC CAGATACTAAGAACTGTGTCCAAAGAGCTTG GGACACACACTAAGGGGCCTGCCTCTTTCAT AACGGGGATGAAAATGACTGAGGCTTCACAT TTGCACAGTACGATC	p000988	D	—
IM000847	AAGCCATCTGGGTCTCAAGTTGCTAAACTT AATAACTCCCTCCCTGTGTTTGTCTTTATCT AATGGTAAATATGACCTAATGAAATAGGTTT CTAAGGCTTTCATATAAGGCATGATGTTGAA GGATGGAGGACAGAGTGGGATGGAAAATCA GAGCCTGCACAGAAAACCACAAGCAGCTAA CAAAAGTCCACAACCAAAGCCTGTGCCTGAA ATGTCACCTACAATGCAGTGGACTATTCATAT GCCAGCCTGGTCTCATGCGATC	p000991	D	—
IM000848	ACCAAGAACAGAGCCCCAACTAATAGGATG GTTTGTGACGTGTACATGTGTATGCATGC GTGCATATACGTGTGTGTGTGTCTGTGTG TGTACACCCACACGTGTGCATGTGTGTTGTG TGTTTTTTAAGCAAACCTCAGTGTGTCATACA TACTCTCCTATACTTCCCCTCCCTGTTCCAT ATGAGGGTGCCTTCTTATCTCACAGGGTTGT TTTGTTTTTTTCTATAACAGAATGCCGCTGA TGCTCTTTTTTCTATATGAACCCTACATTTAAT ACTTATCCATAAGCAAAGGAACAGTATCTTAT CTTGCGGATC	p000992	R	—
IM000849	CTGGGGGCTCTGCTACGCGTCAAACGCCTG GAGAACCCCTCGCCCCAGGCGCCGGCACG CCGCCTCCTGCCTCCCTGAGCGCTGCTGCA TCCTGCACGCCCTGGAACCCAGGAGCGCCC CAGCGACCCTGACTCCCTGCCAGCACGTCC AAGGCTGCTTACCCAGCAACCTCCCATCCC CTGAGCCCTCAGTAAATGCCATCTGTAGCAG CTGTTTGTCTGAGCGCCCTGTACTAGGGGG CCGGTGGGCTGGGTGACAATGATAATGGAA TAGTGGCTGTCCTACTGAGGACAGCACAGTA CTGTTTGGGACCTGTACTGGTAAGGAATACA TGCCTGCTTCCTCTGGACTTTGCGGGTCTCA CCGGGTGCCTGGGCTACCTTCTAGGCTTC ACTGAGGCGGGTTCCTGGGAGGCTCTGAG GTTACTTTCAGCGTCTGCCAGGGTCCACAG CACTTAGCCAAGGGGCTATGGATTCACTCGT GGTCTGCCAGGACCAGGCTTGTGTGAGGG CCCCAGGTGGATC	p000993	A	Saas

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000850	GTGTTTCCTTTCTTTCTTTTTCTTTTTCTTT CTTTCTTTCTTTTTTTTTAAATCTAAGTAAG GTGCAACAATGTAATTCGAAGGGGCAGTGTC TTCCCTTCCTGTAGTCTCTGCTTAATTCCTGA AGTTTGCCAAACCAGGAGTTAGGAAAAGTTG GAAACCTGCAGAGAGAGCGTTTGAGAGGTTT GAGATGTTATACGAGAGGGTTTGGCAATGTG TGGAGTACAGGTAACCTTGCGGTTATTGTTTT CTTGGCCCTCTATCTTCATCCTTTGTGCTTGC TATTTACCTTGCTGTGCGGATC	p000994	R	--
IM000851	GATCCTTGAGTCTGTACTTAGCCTGAGAGCG CTATAACACTATATACAAAGTACCGACTAGAA ACTCCACACACATTTGTTGACTGACTTAATGT GTAGCCCTGCAATGGTTGACAGTTGGGGGT CAGGGGGCTCTTGCACTGAGGGTAGTGAT AGCCTAAAGAGATAATCAAGATGATAAGTAC ATCCACACTAGGACAGGAGCTTTAACAAGAG CTTTTAGTGAAGGGAACTTTCTGGGAGCCTC AAGGAAGGCATAT	p000995	D	--
IM000852	AGCAACACCTCATGTGGGAATTCATACATTG TAGGTAATCAGTCTACTAGCTGAATATATCT CCAACCCAGGAGGTCAGGTTTGTTTGTTGT TTAACAATCTAGTTTTGAAACAGTCATATCCT AGGCTGGCCTCAAGTTATGTAGTCAAAGATG GCCTTAAAAGATGACTCTTGTTATTTTCCAA GTGCTGGGATTATAGATATGCACACCACCAC ACCTCATTTGTCTCGGGGCTGGACTCAAATC CAGAGCTTCATGCATGTGAGGCAAGCACTGT ACCAACTCGACTTTTGCATACTCCATTGAAA GTCATTTTATAACAGGATC	p000996	D	--
IM000853	CTACTTATCTATCATCTATATGTCTATCATCTA TCTATCTATCTATCTATCTATCTATCTATCTAT CTATCATCTATCATCTATCATCTATCATCAAT CATCTATCTAGCATCTATCTCCAGAGCTCAT GTTGTGGCTTGGGCTTCTCATTTACCATCA TCGAAGGTAGTTGCATTTTTCTATTGGCTTC TTAGAAGCAGGAGGCACATGAAACAACTTGC TAACCCTTTCCTGGTCTTTGTTGTTGTTGGT GGTGGTGGTGGTGATGGTGGTGCTGGTGGT GGTGGTTGATGTGCACAGGAGACCTGTCCG GTATGGAGATATGGAGAGCGTCTACGTCCTC ATGGGATC	p000997	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000854	GTGGGACGCGGAGGGTGGAGATGAATTGAG AAGCAGTTGTCGATTCCTCCTTCTTCCAAAC ATCAAAGGCAGCGGTGGATGACAACTGAA GGACAGAGGGTTTGATGATGCAAGAGGAGC CAGCAGCAACCAAGGCCAGCCTCTTGCGGG TGTGGGCAGGGCCTTCTTTACAATGAGTTCA CACACACACACACACACAGAGAGAGAGA GAGAGAGAGAGAGAGAGAGAGAGAGAGAGA GAGAGAGAGACTGCTCTTTCAGAACAGCCCT AGGAGGTTAGCTTCAGACTAAGACAGGAGA CAGAGAGTCCTTGATTTTGCCAAGGTTGCAC AGCTGGGGAGAAACCAGCTATGGCTTCAC CTTGGCCCTTGTTAGGACTCCTTCCTAGTCC GGTTGCAGTCTCCTGGATC	p000998	R	—
IM000855	GTATTAGAGGCCAGGCCATTGAGAAGATGTG GCAAGATTGTCATGTGGAAATATTTGAAAC CATTCTAACCTAGTCATTCCATCATCAATAAT AATAATAATAATAACTACTAAATGAAAAA ACCTAGATATTTTGAGACTGTACTGCTGTATT TTAAGAAATACACGGAAATTTAGCACTGAAAT TTAGTGCTAGTTTTAAGAATACTTTGTACCGT TACTTGGACCCACAATTGCTTAGAGCAAGGG ATC	p000999	C	—
IM000856	GATCCTGAGACAGTACAGGAACTAAGAAGCC CTGGGCAATTTGCAGTGTGCACCCAGCCT GAATTTGCCTGGTTCTCACCAGCCTACCAAT AGAGCATTGTAGTGGCAGGGATGTCTGCTG GTGTCTCGCAGACAACCTTTGAGGTCCTGCT TCTCCAGAAGTGTGCAGCTGGCAATTAGCAG CCTGGTCTTTTCCTGTCCCAAGACCAGTGC TTCCACCAACCTGGTCTCTTCCACAGCCCA GCCCTTTCTCTTCCTCTTTGACACCCACTTCC TCTAAATGGTGGTCACATGCTTTGTCTCTTGA AAAAAAGTTGTATGAGTCAGGGTATTTTCAAC GCCGGGACAGAAAAATTGACTCAACCTGGCT TTTTCAATTAACCACTAATGGGTTTCACTTAC AGTCCTGACAAATACCAGGCACAATTCATCC AGGACAATAGTGAAGAATTTATCTCTTCCC CCCAAGCCAGTCAGTCTGGTTTAAATATGCA CGGTGGATAGCCCATAGCATGCAATGAACTG TGAGCACCCCTCTGGGAGTCAGCAGAGACA CACACACAGGCACCCATACCACACTGTGC TTTGTATCA	p001000	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000857	GATCAAAACAATATTCAAATAATGACATCAGT CAAAGTATGATTTGATGGCCATCACTCATGT CAATAGGCAACACATAAGCCTGAGAGTAAGT TAAGGAGAAATTCAGCAATAAACAAATTGAC ATACTATGTCCACTATGAGTAAACCTGCCT CTCTTAAACGTTTTACTGTACTCCATGGCTC TCCCCCAATGTGCGTTCGTGAGAGTCCCCAC CCCTGTGACTCCATCTGTGTGTGGGTTTCAGG AGAGACTCCTGTGTGTATTCAAAGAGCCCC CCATGTGTGTACACACAAGAGACCCAGTGTG TGTACATGAGAGGCCCCACCCCATGTGTGTT CATGAGAGACCCAACCCCTGTGCGTGTACAT GACTCTCCCCATGTGTGTTTATAAGAGACTT GTGTGTATGGGAGACTCCACCCTGTGTGTGT ACATGAGAGACTCCTGCCTCTCCTGTGTATA TGAATACCTTCAGAGTATCAAATATTTTCAC CCACTGAGCCATCTTAGAATTCTCTCCCTT	p001001	C	--
IM000858	ATACATATGTACACACACACTCACAACACA CATATATACACATACATACATACTCACACATA TATATACACACTAGTACACATACGCAAATA CACACATGCATATACACGTACTCACACATAC ATACCCATACTCACACAACACATATATACAC ACATACTCACATATACATTACATACATACAC ACATATATACATACACACTTGCATACACAC AGCACACACTCACACACAGAGACACACAGAC ACACAGACACACACACAGAGGAACCCAAAG GATTGGAAGAATAATTTCTGTGCTCAGTGG GAAAGTTTACCAGAAAGACAAGTGGTCATGT GGGATGATC	p001005	C	--
IM000859	GATCAGGGACCCTGTACCCTCCCCGTGCA GCCTGTGATTC	p001006	C	--
IM000860	GGACTGTAACCAACTCGGAGAGGAAAGGGC TTATTTCATTTTAGTCTTTACAGTCCATCATTG ACGGAGGTTAAAGCAGGACGCTGCTTACTG ACTTAGCTCCCCGTTGCTTTATCAGTACTTT CTTAATACAACGCCACCCCCGCGCGGCCA CCTCCCTAGGCAAGACCCACAGGTCAATCCA ACAGAGAGGATTCTCAAGTGACACTCCTAT GTCAACGCTATCAATGGCAAAGGTATATTGA GCTAAGAATTGATC	p001007	D	--
IM000861	GATCTCAGGCTGCCCGTGGGCGGGGCTGAC GGAGGGAAGCAGACTAGGCCTCTACCATAT CCGTGGGAGGGACTTCCAAGGACCGAGACT GAAGAAACAGCGCGAAACAGGAGACACTGG GAGGAGAGGCGGAGACCGACACTTAGTAG	p001009	B	Mm.76753

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000862	AGAGAAAAGACTATCTTGACCTTTGGATATG CGGGTGCAAAATGAGAAGACCACAGTGCA GCTGTGTGCCCTGCACGGGGCAGCGAGAG GAGAAAGAAGCATTTTACATGAAGCACAGAA CACGCCTGACAGTTCTCAACAGCAGCACGTC AGACCACCGCAGCACTGCTCGTTTTCTCAG CAGACCCCCAGGAAGCACCACCAGGATGG ACATGTAGGGGTGCATCCGAGAGAATCAAAA TCACACAGGGGCCATCCTTTTGGTTCGGCAT GAATGATGGGGGCCGCTGCACTGGCCTCC ACCTTCTATGGTTGTTCTTCCTTGATCAATG TTTCAAAAAAATCCTTGGGCTCACAATGC CTAATGACATCTTCAGGAGTCAAGTCAAGAA AGAGAAAAGTAGCCGACCTGGCACGTGGTA GATAAGACTCAAGGGTGAATAAGCAGATGA ACTGGCTTAGTTGGGCTTCTATTGCTGTGA TAAACACCATGACCAAAGCAACTGGGGCG GGGGGCGGGGGGTGTCATCTTACACTTCCA TATCACAGTCTATCACTGAGGAAGTCAGGGC AGGATTCAGGCAGGAACC	p001011	R	—
IM000863	GATCGGCCAACACAGGATAGATACCACACA GGATAGGAGGTACAGTGTCTGGAAGATTATT ATCGAGCCCCTGAACGTAGTAGAAGCTGGC TGTCGTTCCAGTGCAAGCTGAGCAGATGGTC C	p001013	D	—
IM000864	GATCCACATGAAAGCCAAGCTGCACATTTGC TTCATATGTATGGAGAGGCCTAGGTCTAGCC CATGTATGTTCTTTGGTTGGTGGTTCAGACT CTAAGAGTCCCAAGGGTCCAGGTTAGTTGAC TTTGTGGTCTTCCTGTGAAGTTCCTATTCCC TTTGGTGCCGTCAATCCTTCCTCCTATTCTTC AATAAGAGCCCGCAAGCTCCATCCACTGTTT GCTTGTGGGTATCTGTAA	p001015	R	—
IM000865	CCCTCAGCTACATAGTCAATTCCTATCTAGC CTGGGTATGCGAGATGGCAGTAAAGACACTA GCTGCAAAGCCTTACTGCCTGAGTTTGATC	p001018	D	—
IM000866	GATCCAGTCACAGGAGAGCAACTGGGGGAG GGAGCAGGACAGAAGCACACCATAGCCCTT TCAGGGGGCCGGGGGCGAGGGGTGGACAA GAGAAGACAGATAATGACTCACAGGATGAAG AAGCCTCCACAGCCCCTCCCTGAACTGGC CATCTGTTCTGGGGCCCCAGAGCAGGCGAG TACCGTGAAGCTTGGGGACTAGCAGCCGGA CCACTGAACAAGGTCAACCAGCCAGTTGTCC CACGAGGGGAGAAGCTACCATTGAACTGTC ACTTTGGAAAGTAGCCAGAGCCCATCCCTGG TCACCACCCAAC	p001019	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000867	GATCCCTAGAGCTGCTGGTCAGCTGGCCTG GCTGAACTACTTCTGTGCAGTGAGAGACCC TGCCTCAAAACACAGATAATGGAGACAGATA AATGACATCGTCCGCTGTGTCTGCGTGTGTA TATGTAACACAACACACAGTATACACACATAC ACACCACACTCATACCGTCACACATGCACTC TCAGTGCAATGTGCAACACAACACAGTGTACA CACATACATACACACCACACACATACACATA CCACCACACACGCGCACACACACACATAA	p001020	R	--
IM000868	GATCCTTGTGCATCACTGAGCCATCTCCCCA GCCTACAGTGTAAGTATTCTATACATATTAAT TTAATCCTGCCGGGTGGTGGTGGCGCACGC CCTTAATCCCAGCACTCAGGAGGCAGAGGA AGGTAAATTTCTGAGTTTGAGGCCAGCCTGG TCTACAGAGTGAGTTCCAGGACAGCCAGAG CTACACAGAGAAACCCTGTCTCAAAAAACCA AAAAACAAAAACAAAAACAAAAACAAAA TCCTATGGAGTATTCTAAAAGTAAACCGTAT CATTAGCACTGCCAAATAACAGAAAGGAAGA CCAAAGCAAA	p001021	R	--
IM000869	GATCCTCTGAAAATGGAGTTACAGATGGTTG TGAGCTGCCATGTGAGTGCTGGGAACTGAA CTCGGGACCTTTGGAAGAGCTGCTGGTGCT CTTAACAGCTGAGGTGTCTCTCCAGCCCCTT TGGGTGTGTTTTGTTTTGTTTTGTTTTG CTTTTTCAAGACAGGGTTTCTCTGTGTAGCC CTGGCTGTCTGGAACCTCACTCTGTTAGACC AGGCTGGCCTCGAACTCAGAAATCTGCTTCC CAAGTGCTGGGATTAAGGCGTGCGCAACC ACTGCC	p001022	R	--
IM000870	GATCCAATATATTCATATGGAGATACATGTAT ATACATAA	p001023	D	--
IM000871	GATCCAGGTCCTTTCCCCCTTATGGTCCTAT ACACCCCTGGGTACTTAGAGGCTTTAGCTC TGAAGTGGTGGTGGGGAGAGTGGGGGT TACACATGTGACACAGGTCCTAAAAGCTGTC GCCATTGGCACATGACCATCCTAAGTCTGTG GCAGAAGGCTGCTCAGAGCCTCTGTCCAGG AACAACCCAACACATTGCAGAAATAACTGTG CATCTGGGCAATGGGGCAACTACTACCTGTC CATCCAGATAGCTCTTCTAGAGGCATTGAA ATAACACGTAAAGTGGGGTGGTGATGAACAC ATATAATCTCAGCCCCTGGGAACCGGAGACA GGGGAGTCACAAG	p001024	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000872	GTCACAGTACTTGCTCACTTGCCTCTCTCAT GGTTTACTCGCCCCCTCCTTCTCGTACCCCT TTCCTCCTACAATCCTCCTCGTCTACTTTCAT GCCGTATATGTCAAACACCGTCATATATAAC AATGTATGCATGCAGCATTTCTTTTCTTTCC CATCAGCCTCCCTTGCTCCCCATCCTCCCGC CCTTCCTCCTTCTCCCAGGATC	p001026	D	--
IM000873	AGTTATGCTTGCAGACAGGAATGTAGCATGG CTATCCTCTGAGAGGTTCCACCCAGCAGCTG ACTCAGACAGATACAGATACCCACAAGCAA CAGTGGATGGAGCTTGCGGGCTCTTATTGAA GAATAGGAGGAAGGATTGACGGCACCAAAG GGAATAGGAACTTCACAGGAAGACCAACAAA GTCAACTAACCTGGACCTTGGGACTCTTAG AGTCTGAACCACCAACCAAGAACATACATG GGCTAGACCTAGGCCTCTCCATACATATGAA GCAAATGTGCAGCTTGGTTTTCATGTGGATC	p001027	R	--
IM000874	GATCGTGGTCTTCTCTTTTTCCCTCTACT TCTTCTTCTTCTTCTTCTTCTTCTTCTTCT TCTACTGTCTTCTTCTTCTTCTTCTTCTTCT TTCTTCTTCTTCTTCTTCTTCTTCTTCTTCT TCTCTGTCTGTCTGTCTCTGNCTCTGTCTC TCTCTATCTGTCTTTCTCTGTCTCTCTGTCT TCTGTCTCTTTCTCTGNGNCTCTCCCTGTC TGTCTGTCTCTCTTTCTCTCTCTGTCTCTC TCTCTCTGNCTCTCTNTCTCTGNCTCTCTCTG NCNCTCTGNCTCTGTCTCTGTCTNTGTNTNT CTCTCGCTCTCTNACACACACAGATGTAC ATGCAC	p001028	R	--
IM000875	GATCGGCGGTATCATATTTATGTGTTTTATT TCTGTGTCAGAAAGTTTAAAGGCCTCAGAT TGGAAGTCTGGTTTGCATGGAATGCATATGA GCTTTTTCATCTTATTGCCCAACAGATTTAGT CTAAGAACCACCTCTATTATATAGGGTATGAT AAGTAATATAGGTAAGGGAATGCATCCCAT TGATAAGTGAAAGTTGAACACACATAGAGTT GGCTCACCCCGGGTCTAGGCTCTAATCCC CTGGGGATACCCAGGCCAACTAAACGCTATA GCAACAGGCATTGGGGCATGAAGATACTTTT TGTTGTTTGTCTTGAATTTATATAGGGGCTTA TATCTCATTACAATTAATCATGAGTTGCAGTC AATAAATCTTCATTGCTCAACATATTTGTACC CTCAAATATTTTTTCTTTTTTGTGTGATAT	p001029	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000876	CTTGTAACACGATTATTTTAAAGATATAAAT GGCTCTTTACTCTGTTTAAAAATTGTTTCTTTA CCAGTTCTTCGTGTACATTGGTCTCCATTTC CATGAAATAAAATATTTTGTTAATGTTAGATT TTCAATACCAGCTGAGTGTTTCGATGTGTGCC TTTTGGACATATATTTGTTGTAAGTGGTCAT TTGGGATC	p001031	D	-
IM000877	GATCAGATTCAACTCCCGCATTCTAGCCCC AGCATCGTGGAAGGGCTACTGTGTCTTTTCA AGCACTATGGTGGATACACATAATGCCAGCT TCCCTCATTACTGGTGATGTGAGCTGTTTGC CTAAGGTCCTTTCTGCCAGGCTTCTCTGCTG CCAAGGCTCTGAATTTCCCTTTGTAGCTAAT GCGTAGCCCTATTGGCAGACTCTTCCCGTGG CTGACTTCTGCCTCCCGTCACACAGCAGTAC CTTGTTTGTCTCACCTTGATGTTTCTTATAT GCATTGATGATGGTGAACAGCCCAGCAAGT GCGCCTGTTTCTTCCCTTCTCCCACTTTTGT TCTCAGTTGTACATGGCAAGGAAAACCAATT CCTTCTTTCATATTTCTCCAGAAAAAAATC CTCTTTATAAGAGTTCACATCCTTGAGCACAC ATGATAGGAGCTGGTAGCCAG	p001032	D	--
IM000878	GATCATGATATTGTACTGCTGAAGACAAACA TATTTAAGATATAAGACTTGGAGAAATCAAGT TGGTATTGACATTGGAGATTAATCTCTTTTGG CTAGCTTTTGTAGAGCTAGAAGTTGGTATGT AAGCTATAAGGAAGAGAAGTATTCATAAGAC TTACCCAGTTGTCTCTCCTGTAAGCTAAGAC CAGCCTAAGAAGCTAAAATTATCTTTAATGTA GAACCACAGAGAAAGAAATTGTGGTATGAAT TTTGCTTGTTTCGTGGACATTAAACCATTAAC AATGATAATCAAATGACAATACATAGAGACAA AGATATGCATACTAGTAAATAGTGATAA	p001033	D	-
IM000879	GATCGTGCTAGAGAATGGTACACTTGGGTTA TATTAAGAAATCTTGTTGAGTGGTGGTGGC ACCCTCCTTTAATTCCAGCACTCAGGAGTCA AAGGCAGGCAGACATTTGAGTTTAAGGCCTG CCTGGTCTACAAAGTGAGTTCCAGGAAAGAC AGGGCTATAAAGAGAAATCTTGCTTTGAAAA AAACAAAAAACAAAAACGAAACAGTAACT GAAACCGAAAAAAGAAAGAAAGAGAGA AAGAAAGAAATCTTACAATGTGGGAGCTGG AGAGCTGGCTCAGTGGTTAAGAGCATTGGCT GCTCTTCCAGAAGACCCAGGTTCAATTTCTA GCACCCACATGGTGGGTACACCTGCCTGT GGCTTCAGTTCTAGAGTTTCTGACACTCACA CACAAACATACATTCAAGT	p001034	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000880	GATCTTGTATTTCTTCTTGGCTTGTCTCCATA GGAACAGGCAGCACAGCAGAGGTCTGGGAG ATGGCTCCGAGGGTAAGGGACCAAGCAAGG TCACCTGCGCTCACTCCCTGGAACCCACACA GTGGACAAGAGAGAAAGACTCTATGGCCTC CACGTGCGTGCGTGCGTGCTGTGGTGTGCA CGTGCCCTCCCCAAATAAAGAAAACTTAA CGAAAAAAATTAAGTAAAAAACAGCACT GCAGTAGCTCCAGGAATCAACTGGTCAATCA GTGTATCACATTTGACTATCCGATGATGTTT TATTTTACATGTATGCACGTGTTTGCATGTAT GTGGGTGCACATGTACAAACACATGTGCCAA GGCCAAAGGACAACCTTTGGGTGTCCTTTCTC AGGAGTCATCGACCTTATTTTCTGAGACAGG GCCTCTCACTGGAATCTGACTGGCCAGCAG CCTCCAAGGATGCTCCCCAACCTCAGAAG GATGCGCCTGTCTCTGCCTCCAGCCCCGG GGGTTACACTGGTGGACCACTGGGCTCTTTT CACCTGGGTG	p001035	B	Mm.13883 4
IM000881	GATCTCTTCTTAAATTACATTACAGTAGAAA ATGTTTATGAGGCCGTTTTATCTCTAATATT ATTTATTACCACTCTCCTACCCCAAGTCTT ACAGGCATCAGGGAGTGGACAAAGGCCGGC GGTACTGAATGGTGATGTTATTTTGAATAA TGAAAAG	p001036	D	—
IM000882	TACCTGTTGCTCCAACATGGTCAGAAATCAG TTTGTTTCAATTTAAGATACAATGAGAGTAA CACCTTAAAGACTTCACATTTTATGCATATTT GCTACTCTGTGAGCACATGAACGCTTCTCCT TGGGCACGATC	p001066	D	—
IM000883	GATCGCAGATACTGCAGGTATGTAGTAATGA AGTCTGTAAACATACAGAATGGAGAAGGCCA GAGAGGAAAGTGCAGGCATTGGGTAGTCAG TAGGTAAAATAT	p001067	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000884	GATCGCAGCTCTTCCTTGGTGCTTTTCCCCT CAGTTCAAGTGCTGTGGCGGGGAGGACTAC AGAGACTGGAGCAAAAACCACTACCATGACT GCAGCGCCCCCGGGCCCCTGGCCTGCGGG GTGCCCTACACCTGCTGCATCAGGAACACG GTAAGTGCATGGGTGCTGGATGTGAGGGTC ACCCAGTTTGCCAAACACTGCCCTCACTCTG CCCAAGTGGAGCAGGCAGTGGGAGTGGGTG GGACGTGGTGGCCGGGGCTGAGCTTGCCTT AGACCAGGGGCCCTAGCAATGGGAGATGAG TGGGCAGCTTCTCTGGGAGTGTGTCACTG AGCGTGTGCGTGTGTGGGCCTGGCCAGGC GCTTTGGTTGTAGTTACTTGGTTCTTACAACA GCTTTGGAGGGTCTCAATTGGGGTAGTGTG CTTTAGCCACTTAGGGGGACTTGCCCAAGGT TGGCAGGGCTCTTCCAGCAACAGAGAGCC AGAGTGCCCGGCAGGTGCAGCAGGCTCTAC CCAGTCACTGGAGGCAGAGTACAGTGCAGG TGCTGTGAGCACTGGCAGCAGAGCCCTGGG CAGCGGCATGCGGTAATGTAAATG	p001069	B	Mm.28112
IM000885	CCATGTCAGGTGATTAACCTGTGAGTCTAAC TTCCAGGAATGCAATGCCTCTGGCATCTACA GGCATAAACATACTTGTGGCTTACACTCAA CTGACACACCAACACATATGTGCACGCGCAC ACACACACACACCAATTAAAAATAAAATAAC CCTTTTAAAAAAAATATAGAACCTATAGATA ATTGCTTTACTGCACTCACAAACATTTAGGA TC	p001070	D	--
IM000886	GGGGCACATAGTGAGTTCTAGGATAGCCAG GGTTATAGAAGCTATAGTGTGAGACCCTATC TCAAAAAACAAAACAAAACAAAACAAA AAACCTAAGCCCGTGTGGTGGTGTGTCTCA GTCTGAGCGCTTGGAAGACAGAGGGAGGTG CATCTCTGAGCTTGAGGCTAGCCTGGTCTAC ATAGAGAGCTCAAACCAAGTCAAAGTAACAA AATGAACTGTCTCAACAATGACAACAACAA ACAAACAAGCACTAGAATAAAAAGAAGCCAG CATGGTGTGATGTGCCCGTCATCCTACCACT TGGAAGGAGAGAAGCCAGTGCAGGAAAATT AGGGATC	p001072	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000887	GATCCCAGGCTTCCTGTAGGCTAGGCAAGC CCTCTCCCCACCCTGTCCTGGTAGAATTCAT CCCGAATGTCAGCATTCTTCAGTTAAAGGA ATGTGCTCCCTCAGGCTCTCTCCCATGGTGC ATTGCTTCAGCACGCAGGCAGACACTTGCC AAGCTAGGCTCCCTGTCTCCCATCTGTAGGA AATGCTTGGTATGAAGGCCCTGGTGGACCT GGCTAGATGGGCAGCGCCCAAGTGAAGGGCT GTGTCTGGAGCCTGGGCTGTAATTAGTGGTT TGAAGTGGGTGCTCTGGGGAGAGGCAAGTA AGAATTTGCTTTCTGTTTTAGAGCAGGAGG AGCTGGCGGCTGGCTGTGCCTTAGCCGGCT CCTCGAAGAGCATTTGAGGTGTTGCCATCT TAATGGGTAAAGACTCTCTGTGCTAATCTG GTGGGTTGCTTTTAGGCACGGTGGTCCCACT GTGGTTGTGTGAACAGTACCTTAATGCCAAC ACTTTGGAGGCCTAAGGTATCCCCATCTGCA GGAAGTGGGGTGCA	p001075	D	--
IM000888	GATCCTCACACAAATTGAGTAGTACTAACA GAGTGTGATTCACATAGTCAATAAAGGTATA GGCCATCTGTGCCCTGGCTTGACCTCCGCA GACCAGAAGCTAACAAAACCAAAACAGACTC AGTTTCTGCATGCTAACTTAACCATGATTTTC CAGACTATTTCTTTATCCTGTGAAAAATATA TTAATCTCTATTCTGCAGAGTATCCCTTCTTT AAGAGAACATGATTTCACTGTTTTTGACAATA TGCCTAGACACAGAAAAAATCATTTAGTTT	p001078	B	AA793356
IM000889	TTTTGAGTGCTCAGTGAAGTACTTAGGGCAG CCTAAGGAATACAGTGACCCACCAGGAAATG CCTTGTGTTTTGGCAGTCTGATAGCATCACT CACAGCTGTCGGTCGTGACTTCATTGGATC	p001079	A	Edar
IM000890	GATCCAGGGACAAAGAGCCCATCTCCTGTT CCTTCGTAT	p001081	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000891	ACTTTCAGGCAAGCTCTTTGCTCAGTGAACC TGCTACCAACACACAGACTCCTCCTCCCTGTT CCCGTCGTTAAAAAAGTTTTATTTGAGGTTT AGAGCAATGGCTCAGTGCTCAAGACTACTTG CTGTTCTTACAAAGGACCTGGGGCTAGTTCC AACACCCACATGATGGCTTACAATTCTCCAG TCTCAGGGGTTCCAGAACTCTTTTCTGGCA TTGAATGCACATGATGCATATATAGACAAGC AGGCACACACACACATAAAATAAAACAAA TCTTTTGAATGTAATTTTAAAAAGATTTATTAA TTTTAATTTTATGTGTATGAATGTTTTGCCTG CATGTATGTCTATGCACTGCATGTGTGCCTG GTGCTCAAGGTGTCTGATAGCCTGGTGCTG GGCTTGGTTCACCTAACAGCTGGCCCTATGA AGGCCAGCCGTGAGGACACCTATCCATGCT GACAGACACAGATGCTCAAATGAGACAGCC CCTTCTCTATGAATGCCCTCTTGAGAATGAA CAACCTCCCTGCAGCAGACCTCCTTCTGGAT ACCCTGCCCTTCCATACTTTCTGGGTGTCTA GTTCTCTCC	p001082	R	—
IM000892	GATCACACGCTTCACCTAATTACAAATGATTT CTTTAGAGGGGTCTGTATATAACAGAGATGA TAAATTC AACGGCAGCCCTCCAAGTGCATT GATATACAGGAAGTACTCATGAAATTGGAGA CACTGATTATCTCTTTGTGTGGTGTCCACATA TGTGCCATCATATCATATTATTATTATTACATG GCTAAAAAATGGGGTCATAGGTTTCATGACC AGAACCAAAATATCCCTGTAAATTTACACAG GATTGATGGTAAGAAATGAAAACAGTTTACAT TTTTGATAATTTACTTACTTGACATAAAATGTG ACTTTCATTTCTTGCAATTCCTTTTCACAGGT AAGGCTACGACAATAGATTCTCAGTTCTCCA CCTCTCTCTATCTTGTCTACTCTATCAGCAGC AATAGCAACAGTTTTCCATGGTCCTTCCATCT GTAAAAGCAATAAAAAATAACAAAGAAAACCA TACAAACCATTAGAATATGAGTTGGTATTAC AACTCTCCTCTCAATACTTCATATTTAAAAAT TACTAGAAATATTCATCAATAATTTTCATTTG TTAGCTCTAGATAATGTTTCCAGG	p001083	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000893	GATCATGGTTATTTTGTAGGGTTTATTATA CATGTCTACATGAATTTATGTGCACCAGATGT GTGCAGGTGCCCATAGAGGCCTGCGAGGAT GCCAGATACAGATAGTTATGAGCCACCTAAT ATAGATGTTGGGAATTGAACCCATGTACTCT GCAAGAGCAGCAAGTACTCTTAATACTACTGAG TCATCTGTTTAGCCCTCCTGTTGGGATTTAAT GGTCAGTGTGAAATACTATGAAGATAGAAGG GTTTCCTAGACTCTGGTGTGTAGGGGTGGG GTATCTGTGAGATGGGTAAGCTCTGTTGGCT TTCTAAGAAGGAGAATGAGCAGAAGGCACAC ATAGACATTCACACTTTCACACACATGCATG CCAAACACCACACATGCACACCACATACCAC ACGCGCCCTCCTGTTTCTTACTATGTAATAAT GTTCTTGTAATAACTTAGTACTCTGCTAATGA AAAGGTCACCACTAACTAGATGCTAGCCTTC AACTTTGGACCAGAACTATGAGCCCAAATAA ACCTCTTGCATTTATAATTTAGCCAGCATGTA GAACTGTGTCAATAACAATGGAATAGTGTTG	p001085	R	--
IM000894	GATCATCTGGCTAAAATTTTATAATATGACTC TTAAATTCCTTAAGAATTCACAAGGACCTTT ATGTTGAAATTACTCATATGTAAGCTTACTGG AATGAGATGGCTCCCAGTTGAAAACACCAT TCTTAAATACTCAGAAAATAAGAACGAGGC CAGCCCGGTCTACAAAGTGAGTTCCAGGAC AACCAGAGCTATACAGAGAAACCCTGTCTCA AAACAAAAACAAAAACAAAAACAAAAA AAAAAAAGAAAAACAAAAACAAAAA GAATGTAGATATAAAGAAAGAATAGTGTG CTGGAAATAAATAGTAATATAAACTTAACAGC AGCCTGTCAATTGCAGGGTTTTGCACTTGC AGCTCAGAAAGAAGTGACCCTCCTCAGGAA GTAG	p001086	R	--
IM000895	GTGGGTTGTGTGACTCAGAGAGCAAGCTTCT ACCTCCACAGGCAAGGATGCCTGTGCACAC AGAAATGAGATGAAGTCATATGTGGGGACTG GAGTTGCAGTGGCTCCAGAAGGAGGTGTG CAGAGTTCAGGCTGGAGTCCAGATGAGGAA CATCAAATAGAGAGGCCCTTGGAGGGAGTG GGTCTCTTGATAAGTAGGACTGCCACCCAT ATCAAGTATAAGACTGCCAATCATACTGAATC TCAGGTTATTTCCCATGTAGCATTGGGAACA TATAGCATTTGTCACACTGCTATAGCAAAGAA TCTGTGATGAGGTTGGGAGTGGAGGGGAAC GCCTTTGGTCCTAGAAAAAGAACCAAGGTA GGCTGATC	p001087	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000896	CCTGCCCTTGCCAGACCCGACCGCAGCTCA TCGAGGAGGTACCCTCTAAAGTCGTCACCTT GAGGAGACAAGCTCTGTCATAGTGCTCGCA GCCCCGCGGCCCTGCGCCAGGTTGCGGA CGCCATCTTCCCGCGCCGTCGCCGCCATCT CCTCCTCCTCCTCCTCCACCACCTCCCCCTC ACCTGCCACTGAACCTTTCCCCCAGCTTGGA AGCCACGCCTTAAGGAAGCAGAGTCGGTCG GACACCCGCTCCTCCTCAGAGCAGCGGCCA CCAGAGTCAGGAAGGGGGGTCCAATCACG TGATC	p001088	R	—
IM000897	GCTCAATTAGTTTATTTAAATTCAAAACAAAG CTAAAAGCCTGATGTGTGTCAGTTGCCCTCAGC AGAGCTGTTTGGGGCCCATTTGTTAATGTTGT GAATTAAGTTCTGATGTAAGTAACCAAGCCA CTCCCCACACTCTTACTTGCAAGAGTTCCAG GCAGATGTTAAGGTCAACCCACCTGACTCTG ATC	p001089	D	--
IM000898	GATCACAGTGTATCTCAGCAACAGAAAGC AAATGAGGACACACCTGGGTCTCACTGATAT ACTTGGTGATATGTGTAGTTATTATGTCTCAC AGTAATTGGACAAGGAAGAGAGTTCATTGTT TTAGAATGTTGTAAGTGGCATTGTTCTTCTCT CTCTTGTTTCATAAAATCTCACAATATCTAC AGCTGTGAGGTCCAAGGGGCTCATTGGTGA TACCACTCTTTCTACTTTGTGTGACCAACCT CTTTGGATGTCAAGGGT	p001091	C	—
IM000899	GATCAGTTGCTATTGCTTGATTGATTGCGAG ACTTTCTTAACAAGAGTCTTTGTCTCCTCTCA CTCCCTAGCTTCATCTTAGAACTTAAACCCAC AGCCCCAAATGAGTAGTTGTATGTCATATGCC TCGGCCAAAGCACGACTGAAAGGAAAAGAA AGGCAGACACTGGAGTGCAGGAAGAAGACA CAAGGCAAAGCCCAGAATTCAAAAGTAGAAG CACAGATTGTTTCTTTGTTT	p001092	C	--
IM000900	GTACCCTGCATCCCCGGTGTGGCCTTGGAG TCTGATGCCAGCACTACAGAGCCAAGCCATA ATACAAACCAAATAGAATTAACAAGAGCTCC ATATGATC	p001093	D	--
IM000901	GATCACCTTCCTAGGATGAACGAAGAAGGAT GGCTGGAGGTTAGGGACCCAAGGGACTTCC CCCTAGAGCTGGCTGTGTACCCTAGGCATGT GTGACTGCAGCTGTACAAGCAGGGTATTCTG GGATTCACAGTCTCAGGATAAGATGACACT ACAGATTCTAAGCTTTATACCCACATGGTG GAACCCCATGGTCACACTCTTTCACAGATGG TCACTCCCATTGCCGAAGCCCAGCCTTTAT CCAAG	p001094	C	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000902	GATCAATAACAGCAAAAGAAAAAAGAAGTT TACTTTTCATGTAGCAATGTGGATAATCCCA TCCAGAGAAACAAAACCAGTCCAG	p001095	C	--
IM000903	GATCAGGGAAGATGTCACCTCCAACCCAGC CTAGACATGGTGCTGTGACCA	p001096	D	--
IM000904	GATCAAGGAGCAACCCAATAGCTTCTATTCC CCCCCTACTAAATATGACCCACTGATGGAT TCTGGGGATGCACAGATGTTCTCAGAAGTTA CTGATGAACACACCATGCTCTAACAAATAGT ATCAAACCCACAGTCACAGATGGCCCTAGTT AAGCACAGTGCATCACAAGCAAAGCAAAGA GCCTTGACTGTGGGAAAGGTACTTGTGGTGA GGACTAGTGGGGTATGAAAGAAATTAGAGAG GATGAAGGTAGTGATATTCAGTGTGTGTGTG TGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT GTGTAAGACTATTAAAGAACCCCTTTTTTAA AGAAAGGCTTTCTTGAGTGTCACC	p001097	R	--
IM000905	GGTTAATAAGCTAGATTATCGTGATATATAA AGTGTGTATGTATACGTTTGGGGATTGTACA GAATGCACAGCGTAGTATTGAGGAAAAAGGA GACTGGGAAATTAATGTATAAATTAATCAG CTTTTAATTAGCTTAACACACACATACGAAGG CAAAAATGTACGTTACTTTGATC	p001098	K	<i>Myc</i>
IM000906	GTGAACGACAGCAGAATCGGGTTGTACCTCA AAGCACTTACCTTTCCCAATACACCTGATC	p001099	D	--
IM000907	GATCAGTGACAATGTAGCTTTCCTGGAAGG ATACTTGAGTC	p001100	D	--
IM000908	GATCAGCAAAATGGGACATCGAAGTTGAACC AAAGTCATAATAAAACATCCTGAGGTACATAA ACACTCTGTAATAGACTAATACAGTTCCTCCA GGCACCAACAGAAACCTTGACTACTTCCCTT GACTACTTCAGTCAAATCTTCTGATAAAACCA GACCCAACTTGGAACGTCATGTATACAAT G	p001101	D	--
IM000909	GATCATCTGCTTCTACCCCAATTAAAAGAC GGACTAAGAACATAAAAAGAATCCAGGCACC TAGGTTTGCAGAAATCTAAAGTTGAGTTCC TTT	p001102	D	--
IM000910	GATCACAAGTTATAGTTGAATAACAAGTCCT GTGTGTGTCTATGTATCCGTATATCATATTTT CTTTATCTGTTACTCTATTGAGAACTAGG TGGATGTGTTAACTTGGCTATTATGAGTTTTG CTGCTAT	p001103	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000911	CTACAATGGTTCAGGCTTTGGAATATCACTCT ATAGGCTGTCTGCCGGCCACCACCTTCAG ACTGCCACTCACAGGTGCCCGTGAAGGCTG CCGAGAGGCAGTCCCATCAGCCTGTCTCC TACACCCACACACTCTGTGTGGAGACCACAG GCGCCCAAAGGGTATGCTAGTCTCTGCTCTA CCGCGTACCCTCTCCTGAAGGCAGGCATTC AGAGATTCCAGTTTCACCAGGAAGCTCAGAT C	p001104	C	--
IM000912	GATCTTTTCCCCCTTTGTAGTATCAGAGAGAA AAGCCATGGCATGCATGGCACATGCTAGGC AAACACTCAAGCATCCTACTCTGTGATGCAG TTTGAAACAACTTTTTTTTCTTTTCTTTCT TTTTTCTTTTTTCTTTTCTTTTCTTTTCTTT TCTTTTTTTTTTTTTTGAGT	p001105	R	--
IM000913	GATCTCTCCCCATCCTCCTGTTGCCTCTTGT CTGTCATACCTCTACTACTCCATCAGTTTGCT GCCTCTGAGTCCCTCTTCTCCTCTCCTATC CCTCCTCCCATCTTCCTCATCTCCAGGTCTC TCCAGGTCTTCCTTCTTCCCTCTTTTCTTCCC CTTTTCTCTTCCACTGTCTTGATTCCCTT CCTTTCTCTGTTGGTCCCTTCCCTCGCACCT CTTTCCTCCTGTCCCTCCTTTTCATGTACCAT ATTTCTCTCCTCTTTCTGTGTCTCCTCTTTC CTTCTCCTTTACTTTCTTCTAACCCTTCCTC TTTCTCCTCCTCCGGCAAGCCTTTGCTT	p001106	A	<i>Gata1</i>
IM000914	GTTGTTCCAGTTAAATTGGCTCTCTACAGG AACATGGCTTAGTTCTCCCTTAGCCTTTTCATG ACCCTACACCTCAGACACTAGTCAAAGTCTA GCTTAATAAAGTGTTCAAGATGTTGGTGGAG GGGGGGAGATTGTTAATACAGATC	p001107	D	--
IM000915	GGACCACTTTAGTATGGGTCATATGTTCTAA CTTTCTTTCATTTTCTAATTCTTTCATCTGCA TTGATTGTGCCAGTTATCATTAGTGACTTAT TTTAGTAACTTAAGGGAAAGTTGTCTATGCTC TACTTAGTGTGATTTAACTTACTCTCCAGAC ATGGGAGTGCTTATTTTGTGCTTACCTC ATCCAGGAGCTTGTAGATC	p001108	D	--
IM000916	GATCCGATTATGAAACCGGTTTTGAAC	p001109	D	--
IM000917	GATCTGTGGAATGCTATCCAGCTCTTCCAAC AAATAC	p001110	D	--
IM000918	TTAGTATCTGCATCTGACTCTTTCAGCTGTT GTTAGGCCTTTTCGGAGGGCAGCCATGCTAG GCTCCTGTCTGCAAGCACACCACAACATCAG TAACAGTCTCAGGGGTCTGAGCCTCCCCTTG AGCTAGATC	p001111	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000919	GATCTGTGGTAATGATTCTGTAAATACAGATA AACAAACGTACACATGGGAATTGTTCCCTGTG TGAAAGTGTTTCATCATAAGGTGTTTTATTTT ATCTACAATATCTTTGGGTTTTTAG	p001112	D	—
IM000920	ACTGCCACATTCCCTAACACCTCATCAAAGA AAACAACACCACAGGTCTCAGGCTGCCACTC TAGACCTCCGAGTTGACTCTGGCTCCTGCTC TCTGCAAGCAAACACGCATCCCTCAAGTCTT CATGCTGGTTCTCTCAAGTCTTCATGCTGGC TCTCTGTAGTTCTGTAAGCTTACCCTTTCAGT GGTGATTTGGGGAGATC	p001113	D	--
IM000921	GATCTCCTGGCTTTGTAGATAAATGAAGAGA GTTTCGTTACCAACTGAACTAAAGAGCGGCAC AGGAAATTAACAAAAACAAACAACTGATAGT TAACTCAATTGAGTAAGTATGGAGTTTTGGG ACCAAGACATATTAGGCAAAACAGACAGTTTA AGGCCTAG	p001114	D	--
IM000922	GTTCTGTACTTTATCATGTCTTACCCCTACC TCCCTCCATTTTAATCATCTTTACTGGGATGT AATGCATTCCTTTGTCCATTCCAGGATGCTAT AACAAAGATACCTTCAGCCTGTAAGCTATAGA ACAGTGTGGTCCTCAACCTTCCTAACTTTGT GACCCTATAATATAGATC	p001117	D	—
IM000923	CCANCGTGCCANACTCANAAANGGAATTTTAT TCATAGATTCTNTCANACTGCTGTCCCACAT GTGTTCAAAANCAGGTAGGTCTTGTCANAT	p001119	D	--
IM000924	GATCTCATTGCACAGAAGAGTTAGAAGAAAG AAAGAAAAGCAGACTGGGAAAAATTTTGTCA GCGAGCATTGAGAGATTGAACATCTATCTAA CTTATGCAAAATTCCTATCAAAAGAAAAAAA AGCTTCAACAGCTGGGTAAAGTTAAATGTAA CTATAAGGCAACACAAGGCAAAGTGTTGTTT TTTTTGCTTGTTCCGAGATGAGCTCAATTAA AATATCAATAGCGACAACAATTCTGAGCTGG ACTAACAAGAGTAGAACAATACTACCCAAC GCTTGTGGTTAGGTAACCTTACACAATATTTT CCTAATGCTATTCGGCAATAATTGTCAAGAAA A	p001121	D	—
IM000925	GATCTTTTCTACAAGACTTCTGGGTGACCTT GCCAAGCCCAGCCACTGGCTGTGGTACCTC ACCAGGACACTCGGTGGACATTAGGTAGTG CTCCCCAAGTGCTAGGTGACAGTTTATGCTT CAAAGTGACTCCTGCAC	p001122	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000926	GTGCTGACGCGCCCTTGCAATTTGGGAGAGC AGTCAAGCTATCTGTACCTTCACCGTAAGAC TACATTGTCACTGCTGGCTTCCCTCCTGTGC AAGGGACGCATTTGGGTGAGACTATGCATGA AACAGGACAACAAAGGTAGGGCCATTGGTA GATC	p001123	D	--
IM000927	GATCTCACTGAATATAAAAAGACATCAGTCC AAGGGTGGAATTTAACCAAAATAATACAATT GTTGTTG	p001124	D	--
IM000928	GATCCTCCAGGAAGTAGAGTTACAGACAATG CCCGCCTTGATT	p001125	D	--
IM000929	GTGGCAGTGACTGTCCGTGTGGGAAACGTTT AGCAAGTCCGAGCGTGTTTCGATC	p001127	K	<i>Nmyc</i>
IM000930	CAGGAGAGTGTCTCAAAAAGCAGCAAAGCA CCCAGCACCTTAGGGTGAAGGACCACTTCT GGAATGTATCCTCCAGTTGCAAATGTACAC TGTCTATTCACTCCTGTGACATACTTTGTTT GTGAATGCTAATATCACATAGTTCGATC	p001129	C	--
IM000931	CCAGCAGAGACCAAGCATCCAAAACATGAG CCCATTTCAGGCTTCAACCATAGCAGCTCCC ATCTCAATCCTGTTCAACCCCCACCCACCC CCCGCTTCTCTATTTAAATCACCCTCTCAGT GACCAAAAAGATGCTCATGGCAAATGGACTC TTGGCTCTCTTTTACCTAATACTGAAGGTAAC AAGATAATCAACTGTTTCTCTCCTTCCCGG GGACCTCATCATAACAATTCTCCACATGA AATTATCACCACGTCCAATACCCACATCCTC CCCGTCTGTAGAGAAACCACATGCCTAGCA GCAGTGGTTTCCACCTCTGTGCTCCCTTCC ACCTCGATC	p001131	D	--
IM000932	GATCGCTGTGGTTGGTGTCTGTGTATATGCA CTGTACATACTAACCAGGTACACACATAAATA TTTAATATATAAAAAATAAAGTGCTTTCTAAG AGGCCCTTAGGCAGGGACGTTATAAACATT TCACAAAGCAGCAAAACAAAATTGATACAAT CAAAAAACAACACTATAACCAACATAGGTG AAAAACAGCCAAACACATAATGTACAATCTGG TGTTCCAGGACAAACATCTGTCATATACATG GTATATACATACATACTTTTCACTCAATAA	p001132	B	<i>Mm.36692</i>
IM000933	GATCGCTAAGTGTGCGCGGCCGCCGTCTGC AGAATGAATGGAGGGAATGAATGAGGGTGC GCGCGCCCGAGGCCCGGCTTGCGTCAGCC ATGCGTGCCCGCATGGACACGGCCTGGCC TTCCTGGGAGGATGGGACCGGATGCAGTTA GTCCAGGCGTTCAGCATCCCAGGGCCCTTC CTCTGTTGCGTGGTCTGAGTAATCTGTCTCG CAGAAGATACCT	p001133	B	<i>Mm.15152</i> 8

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000934	GGAGGTCTCTGTAGGTGCTTAGACTCACGTT ACAGTCATTCCAGAGGAGGGAGCTGCAGCT GCTAGTTTCTGTGCACACCGATC	p001136	D	--
IM000935	GATCGGCTGTCAAGACTGGGGAAGGGTCCT CCTAG	p001138	D	--
IM000936	AAGCAAGAGGTAATAAAATACATGTGGATGG ATGACTCAGGGGTTCCAGAGCATACACCGATC	p001139	D	--
IM000937	GATCGGGGACCTTGCATAAAGGGGTCCAGG GCTCTCAGTCCTTGGAAGG	p001140	B	AA709647
IM000938	GATCGTGATGACTTCATAACCATCACGTGTG AAAAGACTTAATGGCGCTGAATTCACATGAC ACTTAAATGCACAAAGTAACAAATTTTATGT CACATGTATTAACTACAGCTAAGTACATGG GGAAAAAGTTAGACTTAGAATAACTCATCCA GAGTCATATGGTAG	p001141	C	--
IM000939	GATCGAGGAGTAACCCAATAGCTCCTATTCC CCCCTTACTAAAATATGACCCACTGATGGAT TCTGGGGATGCACAGATGTTCTCAGAAGTTA CTGATGAACACACCATGCTCTAACAACAGT ATCAAACCCACAGTCACAGATGGCCCTAGTT AAGCACAGTGCATCACAAAGCAAAGCAAAGA GCCTTGACTGTGGGAAAGGTAATTGTGGTGA GGACTAGTGGGGTATGAAAGAAATTAGAGAG GATGAAGGTAGTGATATTCAGTGTGTGTGTG TGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT GTGTGTAAAGACTATTAAAGAACACCCTTTTT AAAGAAAGGCTTTCTTGAGTGTACC	p001144	R	--
IM000940	GATCGGGCCACATCTCAGACACTCCTATAGC TACAGAGAGATACCGTTTCTGTTATCTTTGC AGACAACCTTTATCTGTTACTCAGAGAAAACCT CCAGGTGCCCCCTAAAGAACTGGGCCCTAC ATCACATACCCATACCACACACATGCAACAT GCAAAACATACACACATACATAGACACACAC ACCACACGCACACAGACACATACAGACACAC ACACATACTATACATACAGACACATATGCTAC ACACATACAGACACACACAAGCACACATACT TCACACACAGAGACACACACACCACACACAC ACAC	p001149	R	--
IM000941	GCCTGCCTCTGCCTCTCGAGTGCTGGGAATA AAGGCGTGCTAGAGCCTTCACTTGGCTCTCT CTCTCTCTCTCTCTTTTAACCTCCTTTTTC CTTTAATGAGTTATTTATTTTATTTTATGTGC ATTTGTGTTTTGCCTGTATCCGATC	p001151	R	--
IM000942	GCTTCAATATTCGAAAAGAATTAGTAAGAAAG GCTGTTTCGATC	p001152	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000943	CTACCAGGAAGTCAGGGGTTTCCAGGAACC CACACTTGGCTTCCTCTGCACAGAGGGACCT CATACCAGTGAGATGGTGATATGCTCCCTTG TTCCTGAGCCTCAGTGAAGCGACTTTCTAT GGATACTCCCTCCCTCGTGCCTCTCCTTCTT TCCCTCTCTGCTCTCCCCCCCCCCCCCTCGCC CTCAGGATC	p001154	D	--
IM000944	ATACACACCATCAGATATACCTCATTCTGATA TACCTACAGGTACACCAATCACACACACACA TTTACTCACATGTACATGCACACACCACATC GGTTAGAACCAAAGACCTCACACACACCCCT CACACATGTTTCATCTCCATTATCAGTGCCGA TC	p001155	D	--
IM000945	GATCGTCAGGTTATGAATGCCAT	p001156	C	--
IM000946	AGTTCTCAGAACCAGCTACTGTTTACACAGG GCCTCATGCAGCCTTGCTGTCCTCCATTCTG CAAGCACAGGATACACACCCCTGAAGGCCA GATTGTCAGGTCAGCCCGATC	p001157	C	--
IM000947	CTTCAAACCGGTCTGCGAGGAGTCCACAA CCTCTGCCTGCCGATC	p001158	D	--
IM000948	GATCGAGGCCAGCCTGGTCTACAAAGTGAG TCCCAGGACAGCCAGGGCGATACAGAGAAA CCCTGTCTCAAAACAAACAAACAAACAGAT TCCATTGAGGAACACCCAGATGGAGACATG GGTGTCTCCATAGAAGGGTTAGGGGCTTCC ACACCGTTGACAC	p001159	B	Mm.81366
IM000949	GATCGGTGTGCTTTCTGCAGTTTCAGCGAGG ACTCTGGGCCCCAAATGTTTTAAAGCAGAAA ATTGGTAACACTAGAGATATTGTCAAATACG ATTTCTCTGGTTCAAGAAATGGCGAGAGGGA GGGCTGGAAGGGTGGAGTGGGAAGGAATTG TCATCAAAGCATTGTTGATAC	p001160	B	AA408945
IM000950	CTGTCTCAGGCATGAAAACACTAAAAGATGA CCAATTTCAATAAAGATGACCTGAATGTCTAC TCAATTCCCACCATAAGGTCTACAAGATGTA AATGGGCCGATC	p001161	D	--
IM000951	GATCGTGGAACAGAGCCTTGAATATAATGA AGAAACAGAGGGCAGGCAGCAGCCGCAGCA CAGCAGGGGCACTGTGAGCAGGCAGCAACA GGGGG	p001162	D	--
IM000952	CTCCCTACTACCTTCCCTTCTGACNTCCA CTGAGATGAGGCAGGATAAAGGGTCAAAAG AGACCTGACCTTCTGTGCCAAAGCCAGGGAT TTCTGGAAGAATAGAAATGGTTCTGGAATTC ACAGATGCAGTGGTCTAGGATC	p001163	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000953	GATCCATAGGTCTCTGCTTTCCCATTCAGG GCTGGAGTTATAGATATCTGTCTATCACCA GCTTTTATGTAGGTTCCAGG	p001164	D	--
IM000954	TATGTATCTACAAGCCAGAAGAGGGCATTGG ATC	p001166	D	--
IM000955	GATCCGAGTTCTCTCCGGCCACGTACCTTCA CATCCCATGCACCCTGGTATGTAAGAAGAGC CCAGCTCAC	p001167	D	--
IM000956	TCCATAATATTTCTCAGAAGGATC	p001168	D	--
IM000957	TATAGTTCTGCCTGTGGAGTGTGAGCAGAAA TGTGTATCGTTTCTGGGTCAGAGCTTTCAGG AACTGAGCATGACTGCTCTACAGTGTCTTTC TCCTTCTGCCTGCTGAAGCCCTAGGGGACAA TAGAACCACAGGATGAAAGGACTCGGGATC	p001169	D	--
IM000958	GATCCAATGGCAGCTAGCAGAGTCAGAGAG CCCTCACTCCAGTTAACTAGGGGACCCACAT GAAGTTCAAGCTACATATCTGCTACAAATGTT TGAGGGACCTCCTAGCTCCACGCCACATGC TCTTTGGTTGGTGGTTCAGTCTCTGTGAGCC CCACTGGGCTCAGGTTAGTTGACCTACAGTC TTCTTGTGGTATCCTTGACCCCTCTGACCCC AGAGTTTAAACAATAGGCCTTCTGACTCTAGA AATCTACCTACATTTTTTCCACTTTAAATTCCT CGGCTCACATAATACCAATGAACT	p001171	R	--
IM000959	GATCCATCTGCACAGTCTGTCACCGGGGTCC AGCAAGTAGCAGCCTTTCTGCTGCTGTCTGT CAGACCCTCCAGGGAGGGAGAGCTTGTCTT CTGGCCTCCCAACAGGACCCTGCGTGACGA TGCAGGGACAGCAATGACAACCTATTCCAGA CTCCAGGTCCCTGGAGGAGCCTCCACAAG GGAAAGAGACTACTTCACTGGTCCTGGGCC CCTCTTTGCGCGCCCCGCCCCCAGACTCAG CGTCTAGTGTTGCTGGGCTCCCT	p001172	K	<i>Pim1</i>
IM000960	AGGGTAACAGGCTTAGTTTGGGGCCTTTCTG TTACAGGAAAACCATGAAATGTCCTGAAGTG CTCAACAAACAGGGAATATAGAAAATCATAAT GGTTCCTCCCTAGCACAAGGAAGCATGTTTA AAAATTGCAGCAAAATAAAAAAGAACAGATTC TTAAGATTGAGGGATTTTACGGGGTGGTACT TTTTCTTTCTTTATAAACATTTATTACTTTT GTTATTCAAGACAGGATC	p001173	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000961	GATCCAGCTGTTTGCTAACATACGTAAAGGT ATGGATGCTGAGAGAGTATCTATCGAAAGCG AAGGCACCCTCCCCAAATTCAGAAAGCAGC TGTTTCTAGAACCAAAGACACCACCGCCGCC GCCGCCACCACCACCGCGAGCGCCCGGA CCCTGTTACAGAGTGTC	p001174	C	—
IM000962	GATCCTGAAATTATCACATTTGAATCAAATCA TGCCCTGCCGAGGATAAATAACCCAAACGAC CGAGAAAACCGAGAAAAAGACATTTACTGA CCATCCTTC	p001175	D	—
IM000963	GATCCAGTCCAGAGCAATGTTACGTCTGTG ATGGTAT	p001176	D	—
IM000964	AAAGGTGCTCTCAACTTAACAATCCATAAG CTTGTGCTCTCTTAGTCGTAAAGGTGGGGTC CATCAAAATCCCATGACACCACAGCGAGACC AAACTCCTTTTCTTACTCCGAATCACCCAT CCCATGTGGGAGACGAATAAGAACACAAACT ACATCTTCAGTGACATAGAGTAGCATCTGCA ACAGAGGAAGTGGATGGAGACCTTGTCTCT GGTCAAAGACAAAGCATGTGACAGCTGAGC CTGGCACTTCTACTTGGGTCACAGCTCAA CCACCTGAACCAACAGCAGAGCCCCACAG GGATGGGACTCACATGTTTCCCTCTTGCCCT GGAGCTTCGTGCATGTTGTTAGAAGCTAACT GGCTAACACGCACGGGAACAGGCAATGTAG TTGGAGTATGAATCGAAGTCACTGGGCATGG TCCTCAGTCAGCCAGGATC	p001177	C	—
IM000965	CTAGACTAGTATGGCAGAACCTATCTTCTTCT AATCATTTAGATGAATACTCCACATGAGAGA GCCCTGAGAATATCTGTAAAAAGTAATCCAG GTTCTGTTACTTCTAGCTAATCTTATCTAGGT AATAATAGATAAGGAATCGGGATTACGAAC ACAAATACCTGTACAAAGCATGTTGTCTCAC ACGGGACGAACACTGTTTCTGCTGTGCTTTA TAACGCTGGGACATACAAAAGTAGACTCTGC CTAAGAAGTGTTTGGAAACATTTGGGTAAAT TATAGTCAGATAAAACAACCATGAGTAAA TCGAAGAATATAAAAGTAGGGATC	p001178	C	—
IM000966	TTTCCTGGACAATAATGTTTCTTCATTAAT TACACTTAGAGCATTGTCTTAATCCATGAATA ATTCCCAGCTCCTAGCTCATTACCTGTGACA CAGCAGGGATTACATACATTTATTGAATGAAT GGATGAGTGAATGAATAAAGAATGAGCATA TCAAGAGGATC	p001179	D	—
IM000967	GATCCCTTCTGTCTTTGGTTATCTC	p001181	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000968	GATCCACCACTGAGCCACTTCTTCAGCCTGT GACTGTCATTCTTAATCATCCACACAGACTTC TCCTTGGCAGATTTTGCCACCTCTTAAGAC TTTCACAAAGGTTTTTTCTTCTGCAGGGCAC ATGAGAAAACAACTCTGTCATAAAGAAACCC AGGAAGAAAACCAGCAGAGGCAGGTGAGTT AAGCCTGTGGTGGACATTCTTCTGGGGATG ACCAGATGGGAACAGTAATTCACAGAGGCA GAGGGGTCTGCAGTCACTCTGCATGCCACA TGTGTAACCCCTTAAGAAAGTGAGGAATGCTCT CAACAGGAAAAACACAGCAGCAAATGCTATG ATACCAAAGCCACAACCTCCATGGGTCCCTGG AGCCTCTCGAACTAAGCTGCCAGCTAGGGA GCTAACACTAGCTTTGGATGAAACACAGCTC TGGTAGAGTT	p001182	C	--
IM000969	GCTGGGATTTGAACTCAGGGCCTTCAGAAGA GCAGTCTGCTCTTACCCGCTGAACCATCTCA CCAGCCCCCTTCGGTTCTTCTTTCTTCCTTC CTTTTTTTTTCCACATTGTTTCAGACTGCA CCTTGTTTAGTAGTCTAGGCTGGCTTCCAATT CCCCAATGATTGAGCTATGGGTATACTCTCT TCACCTACTTTGATTTTTTGTGTTTATTTGT TTTTTTGTTTTTTGAGACAGGGTTTCTCTGT ATAGCCCTGGCTGTTCTGGAACCTCACTTTGT AGACCAGGCTGGCCTTGAACCTCAGAAATCTG CCTGCCTCTGCCTTCAAAGTGCTGGGATC	p001183	R	--
IM000970	GCTTCATTTAATATACATCATTTACCAGAAAC CACAGACATCTTTGTACCAACATATAGTAATA TTAATCACAATAGCCATCACTCTTATGTAAGG ATGAGAAGACTCCCAGCTAATATGCTAATGT GTAGAAGATGCCAGATGGATC	p001184	D	--
IM000971	GATCCCTGCTTCTGTAAATCCGCAACGACAA TTGTTATCTTCTCCTTTTCTTCTTTTATTTGT TTTATTCTATTTATTTTTCAGATGAAAA	p001185	C	--
IM000972	GATCCTCCTGCCTCTGCCTCCTTCAGCAAAT CCTACCGGCGTGCGCCACCACTACCGGCGA AAAA	p001186	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000973	GATCCCCCTTTCTCTGTCTACGGCCTCTG TCCTGTGTTAGCTGTAGGCCTACTCTGTATG AACAGACCTCAGCGGAGGGGTTTGGACTTG GGCTTGTGTTTCTTAAGAGAATGGGGCTTCC ATGACTGTCCCTCTGTCCCTTTCATCCTAACC CTGCCTCCCGCTAACAGGCAGCCTGTATGTT TCTTGCACTGTTCCCTCCTCCTGACGGTCTG AGTCGTTTCCCTCAGAGACTGTTGCTGCTGC TTCAGCTTTCTCTCAGCTTCTCTCAGGGCTTC CGCTCTGGAGTTTCTCCTGCTTCTCTGTTTAC TTTTCAAAGCTCAGCCTCCATCTTCTGCACCT GCGGAGTCATCACTGATTCCCAGCTGTGGC CTGTCACCCTTCCCTTCTTCTCCTCCTGT GCCACCACCATGCACCCTCCCCTTCTGTCTG TTGTGTTGTCCTAACCTTCTTCTCCCCATGC ACCCTCCCCTTCTGTCTGTTGTGTTGTCCTAA CCTTCTTCTCCTCTCTGTGCTCTGCAGGTTT TAGGGTCTCTGTATGATTGTACCTGCATTTA TTTGAACCTCCACTCTTCTCTTCCCTCTCTT ATC	p001187	D	—
IM000974	GATCCTGCAATACCTCTCCTGGGCATATATC TAGAAGATGTTTCAACTGGTAATAAGAACAC ATGCTCTACTATGTTCATAGCAGCCTTATTTA TAATAGCCAGAAGCTGGAAAGAATCCAGATG TCCCTCAACAGAGGAATGGGTACAGAAAATG TGATACATTTACAA	p001188	R	—
IM000975	ATCTAACTATAATAGTTGCAGGGCTAGTTCA TTGTCAAGTGCGTGGCGAAAGAGTGCAAAT CCCGGGGGTTCTTCTTTCAGAATCAACGAGG CAATACACTTGAACATGTATGTTTTGTAATC TGCGGGGCATCACCCGTCTCCAGGATC	p001190	D	—
IM000976	GATCCCCCAGAAGTGATAGTTTAACAGTGAG GTGAATGCAAGCAATAAGCTACCTAAATCAT TAAAACTTCTATTTTATTAGCATCTATTAGTT GCACACAGCAGTGATGGGTTTCATT	p001192	K	<i>Irf4</i>
IM000977	GGACCTCTGTACAAATGTCGGGAGATAAGG GAAGAAAAAGACGACAGAGATAGCAGTCAG GATGTAATGTGTACTAGATGAGTGGTTCAAG CAATAGGATGGAAAGGGCTTAGCAGGAGAG ATTTTAAAGGATGGAGGCAGTAGATTACATC TGGGAAATGTCACTGGAAGTGGATC	p001194	D	—
IM000978	GATCACCAGGCTGGGCAGGCCACCTAAGGA AGTGGCACGGGCACGGGCACTTCCCCAGAG CACCCTCTGGGCACTCTGAGAGGGGCACAG ATGTACTGCACTAGGCTGGGCCCGGAGGAG	p001196	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000979	ATATAAAATATCGAACGTCCTCTGGCTTGTA ATATCATGTTAACCTTCAAAGCGTTCGAAAG CGCAGGAAATCTGAGTCAACAGAATAGTATG TAAGTTTATTTTATAGAACCTGCCTGAACTG CAAGGGAGGGGCGGGGCGTGGACCCAGGC CTGCCTGCCAATCTGCGCTGCCAGTGAAC AGCCTGATC	p001197	D	—
IM000980	GATCAAGTCCTGGTCAGTACCAAGTTAAAA AAAACTATATAAAAGCTATATTAGGGGACA GCTGTGGCTTTGTAGAAAAGAAGGTCCTGG TGCTATGACCTGCAGATGCCCATGTGGAAGT CTTCAGATGAAGACTTTCTCATGGAGTAAAC ATACTCTGTTGTTGACCATGTGGACTTGGT CAAAATGCCCATGGATGCTCCTTTGGGTACC AGGCTTCAGTGGGAGTCCAAGCCCATGTC TTTATTTGAGCATGAGCAGTACTGATGCTTAC CTAGTCTTATTCTTTCTTGCCCCCTGCCTG GACCGTCTCTGGTTACAAGGATGCTGCAGTG GGAAGCGGTATGACCGTTACCTTTATGGGAC TGAGACCAACTAAGGGGAGGCTGAGGAGGC TGCAGTGAAGTTATTGTTGGGACTGTGGGCT AAGATGGAAGATAACATGTTAACAACTCAA GTGCGGAGGTCTCAGAAGTAAATTGCCTG GTTAGTA	p001200	D	—
IM000981	GATCAATTGGTAACCAAGCCTTGAAGTGAAG AGTCGTGAGGTGGGGGACTTTATAT	p001201	D	—
IM000982	GTATCTCCACCTGGCTCAATATAGGCTCTT TTCAAAGGCTAAATTAAGACCAAGGACACAG AAGGGTAGCTCGCTGGGCAAACGTGATCCC TGCTGATAGTGTAG	p001202	D	--
IM000983	CTCTCGTGTGGAGATATTAAGGTGTGAACC ACTAAGCCCTGATC	p001203	A	<i>Scp2</i>
IM000984	GATCAAGCAGAGGGGTAAATAAGGGCAAG CTCAGTGTTAGACAAGCTCATAAGCCAAAGC TGTGAACCTCCAACGCCT	p001205	D	--
IM000985	GATCACTTCAACATCAAGAAGTTACCCAGCC CCGGGAAGAAGTACATTCCAGGAAGCAGT GTTTTCATTTTTTGAGTCTGCTCCCATCCCCT TTCTCTGCAGCTGGGTAAACTTGAAGCTGGG CTAGCCTCTGGGTAGAAGGCAGCTAATGACA ACTACCTTGCCTGTCCACGGAGCCCGGAC AGAACCTGAGATAACACACCTAGCTTGCTGA GTAAAGGCAGGTTACTGTGTGAATGACTCTG AGCTGTTCCAGCTCTGCAGAGCAGGAAGTCT GACTGTGGAGATAAGAGATAT	p001207	D	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000986	GTCATGATTTGTAATTCCTGTCCAACCTCTCA TTGCTTAGGTCAAAATGGCTTAATCCTAGC CTACTTCAGTGTAAGATCATGCGTAATGAT C	p001209	D	--
IM000987	GATCAGGCTGGCCTCAAACCTCAGAAATCCAC CTGCCTCTGCCTCCTGAGTGCCGGGATTAAA GGCGTGCGCCACCACTGCCTGGCTGCTTTC TTTTTTTTCTTTTTCTTTGTGTGTGTGGGTA GTGGTGGTGGTGGTGGTGGTTCGAACC	p001210	A	<i>Hsc70t</i>
IM000988	ATGTGTGTGTGTGGCATGTGTGTGCCATTGT GTGTGTGTGAGTGAGTGTGTGTGTGTCTG TGTATGTTGTGGAACAGATTCCTGTGTATGTT TCCTTCTTCACACATGTTTTCAGAAGTGAAAC CAGGCTATGAAGACCGCCAGGCAGCTCTGC AAAGCAGTACTGAGAAGGTGGGACACTGCG GGGGTGAGAACAGTATGCATGATC	p001212	R	--
IM000989	GATCACACTCCATGAAGCTTCTCTTGCAA CAGGAAACAAATAGCAAGCAAAACCACTGGT AATCATTATGTGGTGTCTAACAGAGAGCGGT GACAGGGGTGGAAAACCTGAATGACATTAAA AGGAGCTGGAGATGTTGGTTTAAGGCGTGT GGGGGCAGCCTACAGCATGGAATTGGTCCA TAA	p001213	D	--
IM000990	AACCATCATGGTAGCTTCTGCTTCTCTCCAC GAAGATGGTTGTTTCCACAGTTGCCCTCTCT ACAGAGTGGTCCTGTATTAAGTCACAGGTGC CATCCTGGTGATC	p001214	D	--
IM000991	GATCTAACCACCCGTTTCTGCCCGGTCTTA GATAGACCTCTTGGCCCCACGCACCTAGA CAATGGAGTAGACAAGACTTCGAGGGGAAA GAGGCTTCCCAAGATGACCCAGCTCATTGG CTTGACTCCCAACGCCACCCACTTACACAGT GAGTATCTCTGGTCTTTGCTGT	p001215	A	<i>Farp</i>
IM000992	GATCTATGTCATCTTCCAGGACTCAGAGTTA AGAGAGTTACCAAGTGAGAGCTCTCATCACC TTCTGAAGCAGTTGAGAATTGGAACCCAGAA AGATGCACATGCACGGGCACACACACCCC ACGGGCACACACCCACCCACCCATGCAGAG AGAGAGAGAGAG	p001216	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000993	TAGGTTGTGCCTGGCCTGTGCAGGACATGC CTATGGGGTCTTCATCCCTCTCACTTACTCTA ATGTTCACTACTGACAAGCACTAGTAAGAAA GTAGGTGCCTGTAAGAGACTGGAGCAGCCT GCTGCTGACTTCAGCACCTGGGAGGCCTCA GTAGCAAAGCTTAGGGTTAGCAATCCTTGGG GCTGTGGCTGGCTGAGCTCTGGGGTACCGT TTAAGAGGAAAGCTGGAGTCCAGGTTCTCCA GGCCCTGGGTGCATCCCACAACCTCTCTCTC TCTCCTTTACCACTCGCAGCCTTGGCTAAGG ATGAGGACCGGGACCTGGAGTTATCTGAGA TC	p001217	A	<i>Snn</i>
IM000994	GATCTCTCCCATCCTCCTGTTGCCTCTTGT CTGTCATACCTCTACTACTCCATCAGTTTGCT GCCTCTGAGTCCCTCTTCTCCTCTCCTATC CCTCCTCCCATCTTCTCATCTCCAGGTCTC TCCAGGTCTTCTTCTTCCCTCTTTTCTTCCC CTTTTCTCTTTTCCACTGTCTTGATTCCCTT CCTTTCTCTGTTGGTCCCTTCCCTCGCACCT CTTTCCTCCTGTCCCTCCTTTTCATGTACCAT ATTTCTCTTCTCTTCTGTGTCTC	p001218	A	<i>Gata1</i>
IM000995	GATCTTAGATGGCCAAATGTTGTGAACGTTT CCTAGATGTGTCGTGAGCACTCAGGGTTGA GAGCCCTGGTTATTTAGCAAGTGAAGTGGAT GTATACACAAGCAGAAGGCTGAAACTAGACC CCGGTCTCTAATCCTATATAAAAACCAACTCC AAATGGACAATAGAAATAAGTGCAAGACTAA CTCCAGGGTCACTGGAGGGATACAAAGGGA GATGC	p001219	D	--
IM000996	GAATGAATATATATATGGGACTAAATGCCAT GCCATAACCAAGAGAACTTAAAGAAGAAAGT GTTTAGTTATGCTTACTCTTCAAAGAGTCCA GCTGCCAAAGGGATGCTGTCAGGAGTAGCT GAGAGCATACATCTGGACCCATTAACAAAGA AGGGATGCTTCCCCAGCAAGATC	p001220	D	--
IM000997	GGAGGAGGGGCACCTTCTCAGAGATC	p001221	D	--
IM000998	GATCTTAAAGCTAATAGGTGTGTGTGTGTGT GTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT TAAAATTGTCTACCAAGCTCTAGGTTACCCC CTCACAGAGCCGGAGAGAAAAGGAGAAATC AACTCAAGTCAACCCAAACAAACAAAGGAC TCAACA	p001222	R	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM000999	GATCTGTTCCCAAATCCTCAGTTACTCTCTG GGAAATGGCTTCTGTATGTACACATGTTCTCT AGCTATGTAATAAAAAGACCTCTCTTCCTTGG CAAAACTTAACCTCTACCTTAGAAAACCTCTGAT GAGTACTAGAAAGATGACATGTTCCACAAAC GTCTTAAGTGATTGAGGGTTCACAACAAAGA AGGAGATGCTATATTGTCTTTCATGACATAG CGTCTAAGTCCCATAGCATAACTTCTATAACA CACAAGTGGGT	p001223	D	—
IM001000	ACACTAGCTTCGAAACTTCTTAGTTGTCTGTC CCTGAGCCCTTTGTGGTACTTCCTCCTCAGA GCCCAGCTCCAGCAGTCCCCTTAGCGGCTG TTTTAGCAACCACACCCTCTGACTGTGGGT TTGCTCTGCAGTGGCTTTAAGGTTTGAATAC GAAATGCCTTCACAAACAGACACTACAGAA TCTTAGGTGTCGAGACAATGGGCATTGAGA AGGAATTGGAACCTTCAGATC	p001224	D	--
IM001001	GATCTAAAGGGAAACCCCTTGTCTTTTTGAATC TGAGCCAGCACAAATATTGTATTTCTTCAATA CGTGGTGAATGTTGTATTAGCAACAATAAAT GGAAGCAGGGAATCTCTCATCTCATGAGTGA TATTTACAATGTCTGTCTGGAAACAAACGGC TAATCAAGTTAGTCACTTACTGTTCTTTAGAA AACACAGTACTTTGAAATGCATACCTAGCAG AGAATATAAGTATTTACTGTTGGACTAGACT GGGCCCCCGGGTGTGAGGG	p001225	D	—
IM001002	GATCTATCTATCCTGTTATAGCCGGAACA TGATAGCAGGATTGGGCAACTCTCCAGTCCC TTTCTCTTGGGTAAAGTCTGAAAGCAAATCG CCCGGACCCATCTCCTGTCTCTGCAGCCTGT CCCAGTGCCTCTGCCACTCACTAACTTCAC TCCTTAATTTAAAAAGCCAGCACATTTATTGA CCGTCT	p001226	C	—
IM001003	GCATGTCTCCAGACTCTCAGCTGCTTCCTGT CTGCTCCTGCTGGATGCTTCATGAAGATGGA GTGAAGCAGTGGTCAGCTTGTCTGTCTCAGC TGTTCTATGTGCATGTGTGCACTTGCTGGAG CTTATGTGCACCACAAGCACGCAGGTGCACA CAGAAGCCAGAGATC	p001227	D	—
IM001004	GATCGAACACGCTCGGACTTGCTAAACGTTT CCCACACGGACAGTCACTGCCAA	p001229	K	Nmyc

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001005	GATCGTGAGTTCAAGACCAGCCTAAAATACA CAGTGAGCCTCTGTCTTTAAGAAACAAACAA ACAACAACAGCAAAAACAAAATATTGCTCAA GACCCAATGTTCTCTCGGACTATTTATAGGAA TCAGAGTTGCTGTTCTTCTCAGGGCATGCCA GTAAATTTGAAAGACAAGGTGTAGAGGCCAA GGAAAAGTGATTTTACTTGGATAACCCACCTC ATGGAGCAGTCAGGGGAAGTCTAGCCTCAA AGCTCTTGCAAGTTATAT	p001230	D	--
IM001006	GTAGAAGCTTTTTAGAAATACGTTTCTTATCT ATCTATCCATCTATCCACCCATTATCATCTAT TATCTATATTTAACATCTATCTAAGTATCTGTT TATCTATCTACCTGTCTATACCTACCTATCTA CCTACCTACCTATAGCGATC	p001233	R	--
IM001007	GATCGTGCATGCATGGGTGTGTTTTGGGGA GAGGTTCTGT	p001235	D	--
IM001008	GTTACTATTCATCTGAGGTTCTCTTTGTTGT ATTTGAACAGGAGGAAGGAACCCAGGAGCTC AAGGATGTAGCTGGAATGCTATAAACTGG GATGCCCTAGAGAATCACACGGACAATCCTG CTAACCCATGGATTGTACACTCCAATATACAA GATAACATGTTTGTGCAGGCATGCCACCATG ATGTTTCGATC	p001239	D	--
IM001009	GATCGACCGCAGATGAGGTCTATGCAGGAA AAACGATGTCTGGAATTTTATTAATTAATTGCTC AGCAACTCACTGCCACGTATACTTGGAGAGC CACTTAGGGAT	p001240	K	<i>Myc</i>
IM001010	CCAAGTATACGTGGCAGTGAGTTGCTGAGCA ATTTTAATAAAATTCCAGACATCGTTTTTCCT GCATAGACCTCATCTGCGGTCGATC	p001242	K	<i>Myc</i>
IM001011	GATCGTAGAGAGATGGACCCAAATATCAGCC AGAGAATTAGACCAGAAAATGGAACCAAAGT ACCTGTCTAGTCCAAGGATGTAGTGGCACTAC	p001244	D	--
IM001012	GTCCCCAAATGTAAACAAAATATCAAAAGA AATTGGGCATGCCAGAATTTTGTCTTCACAT TAAGGGAATTCTGAAATTGAAATCTTGCTAAG GGAAGGGTGGCTTGAGAATATTAACAGAATC CTAGGTTGAAGGAGCAGGAATAGAGGATC	p001246	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001013	CAGCTAGCCCATGGAGCTGCTGGGACACGA GGCCGCAGGCTGAGCATAATGGGGAAGAGA TGGCAGATTCATTACCCACTTGAGGAGACC ACAATTAGTCAGAGGCATGCTGGGCCTGGT CAGAGTGCTCAAATAAACATTCACAGGACCA AAGTAATAAGCATTGGTGTACAGAGATAAAT CCTTTAGCAGGGACACGGGACCCAGAAAA CCGGAAGGACATCGTTCCCATCATGAGAACA AGGACAGCAAACAGTCACTGAGGGTATACTA CTGACCAGTTCCAACAGGGATGGTCAGAAGT TGAACGCTGGATATATCATGAGCTCTGACCT AAATATTCTGAGTATTCCCATGTTTGAATGG ACTGAATACTCACATTTTCTAAATGCTGAATA CTGAATTTTCATAGCAACCATCATAAGGCAT GGTGGCAGAATAATATCTCTCACTCAGAAAG CAAACATTCTAAGTTGGGGATC	p001247	D	--
IM001014	GATCCCGTGGGGACTGAGCCTGCAGCTCAG TGGTAAAGCAGATGTCTAACGTGGTACAGGG TCCCAGATGAGATGACACAAGTACCTGTCAG TACTCCGGAACACTGGGTGGGACTTTTATA TGTTTATTGTATTCTTAA	p001248	D	--
IM001015	AGTCCATTGTGTACTGAGAGAGGAGTTAGGT TTAGAAAGCCTTCCTCAGATGTCCCTCAAAG AAGCTGCTACAACAGCCCTCATCCCAAGTTG CCAAGGATC	p001249	D	--
IM001016	AGATTGCGTGAGTTCTGATGCATGCTGGCCA TGATGTGAGGCAGGGGCAGTGGTTGGATTG GGAGTCAGAAAACCTTCCCGTCTACTGCCGT AATTCCCAGCTAAATTCCTATCCTCGTTGTAG CTGTTGGTGAGGATC	p001250	D	--
IM001017	GATCCTTCCGAATCTGCCATTTATTGAATATT TAAAACACACCTCACTGCAGACTAAACACAT TGCAAGCACTGGGAGCAGAGGTGGCTAGTG AGCACCCTCTAGATGGTCCTTC	p001253	D	--
IM001018	GATCCTCCTGCGTCTACCTTCGGGTGGGATT GCAGGCATGCACCACCATGCTTGGCTTTGTG TGGTACTGGACATTGAACCCAGAACTCTTTG AGCACTAGGCAAGCACATCCTGAACACCAGT AAAACATTTTCAAAGAGAAAAGAAATTTAAA ACATACACCTATCTACATCCATTTCCACCATG TTAGTAAACCAGGGACATTTTGAAGTGTGGT CTTTATAAAAAACCCGGGTGCTTATCTCCC ACGCTCT	p001254	R	--
IM001019	CCAGCGGTGCTCACTACTGCATGTAACCAGC TCCAGGATC	p001255	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001020	GTCTCAAAGAACAAAAATAAAAGAGGAAATT AGTAACGAGTCCTGAGAGATAGAAGAGTATT CAGCCTGGGACCAGAGCTCTGTCTTACAGTC TTGCCATTCTGTGGGGCCTGGGACACAGCAT CCTTGGTCTTTAGAATGCCATAGGCCTCCTG AGGGAGCCTTTTCTGTAGGCACTTCTCCAC ATTCTTGATGGATGCGATTTATTCTGTGTCA GGGGACTAGGGTGCTGGATGTGTGGGTGCA ATGACTGTTGTTCTGTCACTTGGGAATTTGG GATAGGAGAATTCTGAGTGCAAGGCTAGTCT GCACTTGAACGTACATATCGGGTTTTAAGCC AGCCTCTGAGCTACCACAGTGAGACTCTCTC TTAACTAAATCAACATAAATAGTCTTAGTAT GGAGAGGTTAGGGGATC	p001257	C	--
IM001021	CGTTTTCTCGGAAATGTGAAAAGAAGAAG CACGAGACGAAACCCCTCGAGAATGAGAA AATTAATCTAGAACCCAAATGGCGTCCAAC AAGAACATTAGCTCTTGAATGAATATTGCG CCTGCGCAGCCACCGCCGCCAGCTGCTC AACTGCAGCTAGAGCCCGACCCCAAGCGAT C	p001260	C	--
IM001022	GTGTCACATGTATGAACAGCATCACATGGTA TGAATGGTATCATATGGTATGACGTGAATGT GTGCACCGGCACTGATC	p001262	D	--
IM001023	ATACCACCCACTCCCTTAAGAAATGATC	p001263	D	--
IM001024	GA CTGATATTAGTAGGTTGTTCTCTAAGGGC CGTGAAATTTT TAGCTAGAAGTTCTTGCTTTC ATTAACAGTGCCAAGTATGAGTTCATCTCAT GGGGTGGGTCTTGAATACAATCAGAAGGTG GTGAGTTATCGCCATAACATCTGTGCCGCTA TTGTACCAGTGGACATAGTTGCCAGGCAGG CCATTACTGTAGCTCTTAGGTCATTCTGAA GCTCTCTGGGGTCTGTTAGGTGAGACTGATG ATAACTCTTCTCTTCCGTTAGTGTACACAGCA CCTTTTAGCACTATGAAAGCGAGGCAGTATT GATC	p001264	D	--
IM001025	GTTCCGATGTTTGTATCTCGTTTGAATTATCC ATCAGTTGATTAAGTTGATGGTCATCTAGGCT GATTCCCCTACATGGCCATCTCAATATTGCTT CTTTAATAAGACCTGGACAATTAACAGCACC AGTTGACATGCCAATTGGATTGGGGGAGG GGTCTTAAAGGGCCCCGCCCTTAGATGAAG AGCTATACGCAATTAATGACTGTCAGAAAGG GAGAATGGCTTCCCAGAGATGAACCCCTA ATGGATTACCCAGTACCAAGTGATC	p001265	A	Rad52

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001026	ATTCAACCTATGGGGCCGTTAGACCCCTGGT CTTGGGTGGGGTGGATATGTTATTCTTTTTG CTGTGGTGGCAGCAATTTGTTTGCTTCTTG TTTTTGTATACAGTTTCTCGTCATGTATTCT GGTTGCCTGGAATTCATTCTATAGACCAGA ATGGCCTCAAATTTACAGTGAACCCCTGCC TCTGGCTTCAGATTACTGGAATTACAGGTTT GTGCTATCTCACTAGTTGGTGTGTGATC	p001266	C	—
IM001027	GATCAAGTCCCCAGTTAAATGCTTTCTTTGAT AGGTTGCCTTGGTGTGTCTCTTCATAGTAAT AGAAAAGCAACCTAAGACAAGAGGAGAGAG TGGGTTTAAGAACGAGGAGAGAGAGGAACT CAGAGGGTCTGGAGGTCCCGGGAA	p001267	C	—
IM001028	CTCACACATACATTACATACACACACATA TATACATACACACACTTGCATACACACAGCA CACTCACACACAGAGACACACAGACACAC AGACACACACACAGAGGAACCCAAAGGATT GGAAGAATAATTTCCCGTGCTCAGCGGGAAA GTTTACCAGAAAGACAAGTGGTCATGTGGGA TGATC	p001270	C	—
IM001029	GATCATCACCAGTGTAGTGTGGCTTTAACG GTGCACGCCTTTAATCCTAGCACTTGGGAGG TGAAACAGGTAGGTGTGCTTACTTCAGTGA GTGAATTCCAGGCCAGGCAGGGATACAGAG TGAGAACCTGTTATCTAAATAAATAAATAA	p001271	C	—
IM001030	CACCCACGGCTTGCTTCTTTCTCTATGTGTA ATTGAAGCACATACCCGGTGGGAGCCATGTA AAGCCTGTGTCCATGATC	p001272	D	—
IM001031	GATCATGTGTTAATGAACTGTCAGGGGTTG GGTAAGATGGCTCAGTAGGTAAAGGCACTTG CCTCCTAGCCTGGAGACCTGAGGTTCTCCT GGGGCCACAGGGAAAAGGAGATAACCAGC TCTCTGTCCTCTGACCTCTGGGCCCCCTCC TCACAAACAAACAAACAAACACACACAAA CGACCAGACCATTTCACAGTAGCTGTGGT GCGTTACACTGTAACGGGCACCATGTGAGG GTTTGGGCTTTATCATCTCCGCTAGTCATA CTTGGTGTTTCCTGCGTCTTGCTTACAGTTGT TCTAATGGGTGGGCGGTGATATCGAATTGTG GTTTTAGCATGTATTCCTGTGCTCTGCTAAG ACCACTTACAATTACAG	p001274	R	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001032	CCTTAACGCTCCCTTGATGTCCACTCCCGTT TTCTCTGCAGCGATTTATTGCTTAGTCTATCT ATAAGGTGTATGCAAGCTGCAAAGTCAAGTA TTTCCTTTGTAAGTGTGAGCAAGTCTCCTAAGTA TTATGCTTCATAACGTTGTGATATGCTTGAGC AAATTTGAGTCTATTTTCATAATTAAGCCACTG TTCTGATAAAAGACCCTAGAGTGCTATATCT GATC	p001277	D	—
IM001033	AAAAGAGTGTGAGATGTGAGAACTGACTAGC TGGGCTGACACTGAGGAATGAAGGTTGGGG ATATATGCACCTCCTGAAAACAGGAAGCCTT TTGTTGGTTGATC	p001279	D	—
IM001034	GATCAACCTTAGTACACAGCAGAGTGTTTTTC TGGGAAGCTCATGGAGACCCACTTTTGTCAT CCCATAGAGGTTACTACAAATCTGAGCATGA GAATAACTACTTGCTGTTTAATACAAAGAACC ATTAGCAGTCAATGCCCAAGTTCTAAGGGC ACAGACTTCATACGAGAAAAAAAACAAAGC AAAACAAAACTATCACATGCTACTATCTGTA CTGGGGAATGCATACAATTTGTAGGTAT	p001281	D	—
IM001035	GATCAGTAGAGAGCAGAGGGGTCTATGAGG GAGGTAGAGCAGCCTGGGAGGCCTGAGGAA GGAGGGACAAGGGCAGAGTCTTGGTCACTC TTTGGTCTAATTGCCTTCAGAAGGCTTGCAG ACTCTGGTTTGGAGTTCCAGGTGGGTGGCT G	p001282	C	—
IM001036	CAAGTAGGGTTTGTGTGTGTGTGTGTGTGTG TAGCCAGTGTCTTTCTCAATCACTCTCCACCT TAATATTTTTTTTGGAGACAGAATCTCTCACT GAACCTGTATGCTGTCAATTTGTCATGGGCTG ACTGGCCAAGGAGCCCGAAGAATTTATCTCT ATGCTCAATCCAACCCCCAGATC	p001285	R	—

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001037	GATCACATGGACCGATTGCCGCGGGACATC GCACAGGAGCGTATGCACCACGATATCGTG CGGCTTTTGGATGAGTACAACCTGGTGCGCA GCCCACAGCTGCATGGCACTGCCCTGGGTG GCACACCCACTCTGTCTCCACACTCTGCTC GCCCAATGGCTACCTGGGCAATCTCAAGTCC GCCACACAGGGCAAGAAGGCCCGCAAGCCC AGCACCAAAGGGCTGGCTTGTGGTAGCAAG GAAGCTAAGGACCTCAAGGCACGGAGGAAG AAGTCCCAGGATGGCAAGGGCTGCCTGTTG GACAGCTCGAGCATGCTGTGCCTGTGGAC TCCCTCGAGTCACCCCATGGCTACTTGTGAG ATGTGGCCTCGCCACCCCTCCTCCCTCCC CATTCCAGCAGTCTCCATCCATGCCTCTCAG CCACCTGCCTGGTATGCCTGACACTCACCTG GGCATCAGCCACTTGAATGTGGCAGCCAAG CCTGAGATGGCAGCACTGGCTGGAGGTAGC CGGTTGGCCTTTGAGCCACCCCGCCACGC CTCTCCACCTGCCTGTAGCCTCCAGTGCCA GCACAGTGCTGAGTACCAATGGC	p001289	K	<i>Notch1</i>
IM001038	GATCTAACTCAGGCTGTTGAGCTTGGCCAAC AAGCTCAAATATCCATTCCGCTGTACATCG GGCCCCATGTGATGCTTTATATACTAAATAG ACAAGCAAATTGATACTAGATGGGACAGTC TGCTTACCCAGTTTGGTGTGGTGGGGGAG GTGAGACATATCCACAGTCCCAGAGCAACT GTCAGTGCAGGGTCCCAGGGGAGGAGCCAG GTGTGAAGCTGGCAGTGTGTGAGGTACCCT GGGGAAAATGAATGGTTACT	p001292	D	--
IM001039	AGGCCTGGTAGTGACCAGCAAGTACTGAAC GCTCGCTCTATGCCAGACACAGACCCTCTTC TTCCTTCGTCTTATCCTATTATCCATACTGAA CAGACAAGGAAATGAAGGCTTAGATGAGTCA CCCGACTTGCTGAGATC	p001293	D	--
IM001040	AGTGGGGCCTGAAAATCACATCTGGGCAAA CCCTGAGGCCTGCCAAGTCTCATCAGAGG GATGCCCTCTTCATCCCAGGTGCTTTCTGAC TATAAAATAAGGTGAATACTACCTCCCCTGA GGTTACACCTCCAGGGTTAAGCTGGTTAGAG AAGCCAGGGACACACTGGGAAACAGCCCAC AACAGCAGGAGCTGGAGCACTACCCACGG ATGTCCATGGGGTCCAGCTCCCTGCGCTGG CGCCACCACTGGTACCAGGAAGCAGTGAA GAGGTGGCCCAACCACTGTAGAGCGCTTG ATTGGGTGCTTGCGCAGCTCTTCCTCGTGGC CATAGTACGGGAAGATC	p001297	K	<i>Notch1</i>

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001041	AGTGGAAACCAGATTCTCCTACGCTTTGCAC TCCACTTTCGTTTTCTCTTCTGTACCATTCTA ATGGAGGCCAGAGTAGCAACTGTATAGACAA ATCAAATCGTTTACTCTTCCAGTCTTGCCCCT TAACAGTCTTTCCTTTGTTCTTCTCTTAGCC TCATTTTCTCCTTTCTCAGATC	p001298	B	AI604147
IM001042	GATCTTCTGCTTCATCTGAGTAGGCTTAGAC TGGTTTGTATTATTATTATTACTTGTGT GTTGTTATTTTGGTGGGAGTAGTAGCAG TAGGTGTGTGTGTGTGTGTGTGTGTGTGT GTGTGTAGATGTCACAGCATGTATATGGAGG CCAGAGAACAGCTTCTAGCGGTGCTTCTCT CCTTCCTTCCACTGTGGTCCAGGGAATAGAA CTCAGGTCATCAGGCTGGGCAGCTGTCACC TTTAATGCTCTGAGTTATCTCACCAACGTTAA TAAAAGGCTTTTCAAACAGCAGTTTGGGCTG GGCCTGGTTGTGCAGACCTGGAATTGCAGC TTCTTAGGATGCTGAGGCAGGAGGACTGGA AGCTCAAGTTGTGTGCGGGAAACTTAGTAAG TCCCTATTCTCGTCCCGCACGCCCCAAAAA GCCAAGACCAAGACCAAGCAGTTTGGTACA GCAGAAAAAGCACGAGAGTCTCCTCCTCTC CTGCTCCTCTTTAATGATGCAGAACCC	p001300	R	--
IM001043	GATCTGTGCATTATTCTGTTGGAAATGTGACA AGATTCTGTTGAGAATCTCATACTCTATGAAC TCTTAAAAAAGGTTTCTGCTGTTTTGAG ACAAAATTACTTATAAAGGTTTATGATGTAGT TAAGGCCCTGAATGTCCCCAAAGACATGTG TGTGAGGGTTTGGTCTCCACTCCGTGGTCT TTTGGGAGGTGTTTTATGTTAGCTGGTGAGG CATAGTGGCAGGGGAGGAGAGTTGGGTCAT AGTCCTTTTGAAGAGGCTATTGAGGCTCTGG TGCCTAA	p001303	D	--
IM001044	GATCTGACTGTGATAGGAGGGTCTGCGGGC CACCCTGACATAGGCCTGGTCTATGAATGCT CTCATGGACTGGGCCTGTTTGTC	p001305	D	--
IM001045	CTGCCTCTCTCCCTGGTCCCTCTCTGAGGT CTGGACCCTCAAAGGCCCTTTCCCAACCCCA GCCTTCAGGCCTGTAACCCAGCCTCGGTTTC TCTCCCATTTGCCAAAGCACAATGGCTGTTAT AATTAACGGATTATCTCAGCGCGACAGCTGC GCCCCTTTGAAAATTAGGTTGAATAACAAGA TC	p001306	C	--
IM001046	GATCTTGGACCACCACGTCAAGCCTCTTGTA CATTTCTTTGAAAAACAAAGCTTGGTTCCCCC TAGTCACCACGGTGAAAAAACCCAGGACAG TAAAGGTCCCAA	p001307	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001047	TTAGTACCTCTGGTGAATCACCATGCCTGA CCTAAAGCTTTACTACAGAGCAATTGTGATAA AAACTGCATGGTACTGGTATAGTGACAGACA AGTAGACCAATGGAATAGAATTGAAGACCCA GAAATGAACCCACATACCTATGGTCATCGAT C	p001308	R	--
IM001048	GATCGCACCGATTGCCAGTATAGTACCTAGA GTGTCAAGTTGGCCTCTCAGGGAAGAGAGA ACATGTATTAGGGTAAGACGCAAGCCCCAGT AAAAACATGTGAG	p001311	D	--
IM001049	GATCGCTTCACCAAGTGTGAAGTGTGGTAG GGACAGAGCAGACCACAAGCCCCCTCTTTGC ATTACATGGGGGCGTCCTAGTGTAGGTGGC TAGGGATGGTGGACAGGAGAGGAGGGAAGA CAGTATCACATAAGAACAATAGTGGAGGGCA GGGGAGGAAGCCTTCTCATGGCTGGGGTGA AGTCACTCCGTAGCCAGAGCTGACTGAGAA TATCACTGCTTTCCTAGTAAGGAAACACCGG AAGTCGGAAGATGATAAACGCGAAACTCACT ACATCATAGACACCATTCTGTCTTCATCAACA GAGAAATTATAA	p001313	D	--
IM001050	GATCGTCCACTTCTGTGTTTGCTAGGCCCCG GCATAGTCTCACAGGAGAGAGCTATATCTGG GTCCTTTCAGCAAAATCTTGCTAGTGTATGCA ATGGTG	p001316	R	--
IM001051	AGGGTACAGCGAAGCTTGAAAAAGCAAGG AGTGCTCTGGGACCGGGAGTGATGGAGAAA GTCTGAAGCCCCTTTGACACCCCTACAATG GGTTTGCGCCAAGAGAGGCGCCGGCAACTC TACGCGGCGTGGGGCTCTCCCAGCGCTCT AGGTTCTACTGTGCTGAGCCACACTAGTTTC TCTCCCTAGACCTGAAGAGACCCAGAAAGTC TGAGAGTCCCTTTGGTTCTCATCTCTCACC ACCCCCACTCTCGTGCTTTAACTCTGAGGA GGGCCACTCAAGTTCATTCAAGAACAAGG GCTTTGCTCTTAAAGGAGCCGCATACCGAAA GCGTTTGTGTGACTGAGGGTTCACATGCACA GAGCTCCGCGTGTCTCGACATCCTCTCTCTC CGATC	p001317	D	--
IM001052	ATCTCAGGAACTCCTAGCAGCTTTAGTACG CATCGTGCTGTTCCAGCTGTCGGTATTTTA CACAGGTTTTGAGCGATC	p001318	D	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001053	CCTTCAGGATTACTTTGGATGATTCATTAGAG AATCTTGTCTTTAGACTATAAAGCACTTGTTG ACAAGGTTACAATGTAGCAAGCAACCTTGT TTTGAATGTATTTTGTACATTGTGCTCTTC CCTGGTCTGGTCTTTCATTTACATATTTTG CTCTTAATAGAAGTAGGGTTCAGTGCTGGGG ATTTCAATTTGCTGTTTTCTCCATTGACCTCTT GAGCTGAAGTTATTCTTATTAGAAAGTCAGG GTAGGCGATC	p001319	D	--
IM001054	CCAGCAGGCAGCGAGACGCATTTTCGCGTG GCGGTGGTGAGCTCTCGTTTCGAGGGGATG AGCCCCTTGCAACGGCACCGGTTGGTCCAC GAGGCACTGTCGGAGGAGCTGGCTGGACCG GTACATGCCCTGGCCATCCAGGCGAAGACC CCCGCCAGTGGAGAGAAAACCCACAGTTG GACATTAGTCCCCCTGCCTAGTGTTGGGAGC AAGAAAACTCGAGGGACCTCTTAATAAATAC CTGGATTGGGAGAACGATC	p001321	B	Mm.10453 1
IM001055	GTTTTCTGCATAGACCTCATCTGCGGTCTG ATC	p001322	K	Myc
IM001056	AACTAGGAAAGGGTATAGCATTTGAAATGT AAATAAAGAAAATATCTAATTTAAAAACAAAA AAGAAAGACAAAGGAAAATTAATAAAAAAAAAA AAAAGAAACAAAAGCCACTGCAGGACTGCCC AACAGTCTACTGAAACTGTGAGCCTTATTC CTAGATGAGCCTCTGATGCCTCCACTTACAA GCTACCTTCACTCCTCCATCTATCTCCTTTTG TTATGTCCCGCGATC	p001324	R	--
IM001057	GATCGGACTCGAAGAGCAGAAGAAACAAAA CTCAAAGCAGGGATTAGGTCAAATTAATAA GGGTTTGACACAAAAGGAAACCATCCGAAG AGACAACCTACAAAGTGAGAGAACTTGTTT TGAAC	p001325	D	--
IM001058	GTCTGAGAAATTGTCTTAATGTAGTGACTGT GGAGCCTTGCAGGGATACCCACGATGGGGG TGTCATTATATGTCACTGCACCTGGAAGAC CGATC	p001326	D	--
IM001059	GATCGCACAGCCTGCTTTCTCAACAGTAGGT AGGACCAACAGCCTAGGTGGCACCACCCAC AGTGAGCTGGGCCTTCCACATCAATCATCAA TCAAGAAAAATAGCACAAAACCTTTCCCGA AGGCCAATCTGCTGGAGGCATTTTCTCAGTT GAGATTCCCTCTTCCCAAATGACTGCATAAA ACTTGTCATGTTGACATGAACTAGCCAG CACAGGGTGT	p001327	K	Pv1

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001060	GATCGGGTAATTTAGTAATAGTTCATGATATT CATTACTCGGCGTAAATCAGGAAAAACATTT CTAGATGAATGTGGTATTCTCAGTGCACAGT TTGTTTAGTTTAGAAAACAAAT	p001328	D	--
IM001061	GATCGAGGAGGGGAAGTCCTTCCTTCCTTCC TTCCTTCCTTC	p001329	R	--
IM001062	GATCGGGGGTTCAAGGTCCTCCTCGGGGTA CCTATTAGGAGGGCAGCCAGGCTACGTGA GACTCTGTCTCAATAAAAAATAAAAAATAAAG CTGGGTGGTGGTGGCGCACGC	p001330	R	--
IM001063	GATCGACCTGCCTCTGTCTTAAGCAAGAAGG GAGATAGATATGCATAGTATTTAGTGTAAATGA AAGTTACGTTGTATTACGCTGAGGTTTATCAC A	p001331	D	--
IM001064	ATCTAAGTAGTATAATGTTTAAGACGATC	p001332	D	--
IM001065	GATCGTCGTCTAACTTAGCTGGCTTTATAGT GATATAACAAAATATTAGAGGATGCTTTGGTT GAAAAAGAAGTTTATTTGCATCACAGTTC	p001333	D	--
IM001066	GATCGAACACGCTCGGACTTGCTAAACGTTT CC	p001334	K	<i>Nmyc</i>
IM001067	GATCGTCATCATTTTTATAACAGTAGTGAGGA GATGTCCCCTGGGGCCGCCCTGGCTCTGGA GAGGGAAGCCACATGCTCCAAGGGGCTATG GTGAGGACCACAGCCTTTACATTTGGCTT	p001338	D	--
IM001068	GATCATGCACTGTCTGGGATAGTGATGGGCT GTGTCCTTTGTTGGCCAAGAGGAAGTGGCAA AAGGCAAAGTTGCTGTTGGCTCCAGGAGTCA GTCTGGGGACGGGGCTGAGATGCTGTGGGA CAGACTCTGGAAAGGGCAG	p001339	D	--
IM001069	GATCGTGGCCACTGAGAGACCTTCTTCTGGC CACCAGATGCACACAGCTGCATGAACATCTG CATACACATTTAACACATACAAAGTTGAAGAG AAGCACGTGTGTCTTGTGGTCTGACCACTTC CTGGGCACCACCAAGCTGCTCTGACAACGG ATTCCCACTGGGTTGCGCCATCTTGCTTCCT CCCCTCAGAGTTTGCCCATGTCCTCTGTCTT TTCATAGCCACAGCCTTGCCCAAGATAAGAT ACATCCAAGTGTACAGTGCTCCAT	p001341	D	--
IM001070	GATCGTACCAGGAGCTCCAAGCGTACCCCT GATGCTACAACCTCATTCTGAGCCTTGATT CTGTGGACTCTAG	p001342	C	--

MUTATION	SEQUENCE	CLONE	CLASS.	GENE
IM001071	GAACAAGGAAGGAAATAAAGAATAAAGGACA TCTGACACTACCAAAGTTAGGTCAGGATGTG TCTTACAGATGGCCACTCAACAGCCTATAGA AAGCACCGCACAGACCAGCACGGTCTTTTTC TCCCAGGTGTCTCTGAGGTACTGCTTCTTT CCAGGGATC	p001344	D	--
IM001072	GATCCCGAGTCCTTTCATCCTGTGGTTCTATT GTCCCCTAGGGCTTCAGCAGGCAGAAGGAG AAAGACACTGTAGAGCAGCCCCAAA	p001345	D	--
IM001073	GATCCTGGGATTTTCTGGGCAATTGGAGGCC ACAATTTAGATAGTTCCGGAATCGATGTCC CTTAAAGACCAGCGCCTGGACTCTACTGAGT AAACTCCCATTTCAACTTCCTCCTCTCCTCT ATTTGAACAACGTGTATCATTAAATTATAAAA TTGTTGTTGTTGTTGTTGTTGTTTCAAAAATTA ACTTTATTGGGGGAGGGGCAGTTGCCCGAG GACAACTTGTGAGAACCAGGTTTTGCCTTCC ACACTTAGGGGTCCCTGGAATGGAACCTATG T	p001346	R	--
IM001074	AGAGGAGAAATGGGGGTGCGAGAGGACAAA GTCTGTGCCCCACAGCGCTGGGGCCAGAGC CCAGGAGGGCCTCATGGGAGAGGTTGCCTG AAGGCAGTAAGAGAGGCAGAGGATGCTTGG GCCAGAGAGGTTCCCCACAATTGCTTGGATC	p001348	D	--
IM001075	GATCCCAAACAACTGGAACAGGGGTTATCCC AAAAGCTGTTGCCTG	p001349	D	--
IM001076	GATCCAACTCCTCTTCACAAAGAGACTATGT GCAGGATGGAGAAGAAGATGTATCCAAGCAT ATCCTGTGAAATTTATGTCAATGCTGTGAAAT TTGTCCCAGCACTCACAATCCAGATTTCTGC TTTTTAGGTGGCTTTTTCTATTTCAATTTCTTCT GGCTTCATAGAAGTTTGAGGTGACATTTTTAA GACCTGTGCCACTAAAATTCAGACCCTATTT G	p001350	B	Mm.12380 2
IM001077	GATCGGTTAGTTTGACCAGCCATACTATAAC TTTAGTGCAACCCTTTACTTGGTGGGTGGTA CTAGGAATTAACCCAGGACCTTCACATATA CTACTATCATTGAGTTACATTTCTAGCCCTTT TAACCAATTTCCCTTTAACCCTTTTATCCTTT G	p001351	D	--
IM001078	CTCAAGATTCTGTTGTCTGAGAATCTCTCCCT CTGCTTGGGGACCCATTTATAATGAGGTGAT ACTTCATCTGAAGTAATGGCCAGGCCACGGT GTGAGACTCTGAATGTCACATGCTGGATC	p001352	D	--

Breast

TABLE 2

SAGRES #	SEQUENCE	SEQ ID #	CLASS.	GENE
IM000127	CATGTGAGACTTGTTAATTTAGATTTATT CTGTAGTGTTTTTGATATGAGTATAAATA AGACAATTAAATTTCTATATTAGAAAAGTGG CTTTTTACATTGAATATGCTTTTCAGGATA TGCGTGAGAATTTGGCGATGTGTAATC	1	D	—
IM000128	CCTTACTGCAGAGATGACTCGGCCAACGG CTNCGAGCTCCTGACCACTTCCTCAGGTT TGGTTTTGTTAGTTTTTCTCACAGCAAT GGGAAGCATAATCAATACAACCTCCCAGA ATGCGACCTGTGACAAGACCAATGAGCAG ACTCAAGGCTGGGCACATAAAAAGCACCAA AAAAAAAAAAAAAATTCCTTGCAATTATT GTTTCATG	2	D	—
IM000129	GCTGCTCATCACCAAAGGAAGTCAGGACT GGAAGTCAAGCAGGTCAGGAAGCAGGAGT TGATGCAGAGGCCATG	3	R	—
IM000130	CATGGCAAGATGGAGACTTTGTCTACCAG GGCCACTCCAAGCACCCAGCTG	4	K	<i>Fgf3/Fgf4</i>
IM000131	GTGAAAGGGCAGAAATAATTCCTGAAGGT TGTCTCTGCCTTCTACATG	5	C	—
IM000132	CATGACTATGTTTCTTTTAGGTATATCTG AATAGTATGGATCTAAATGATGAAGTTAC ACCATTTTCTACAAATGGGCACAGAACAC AGGGCATAGATACAAATGGCAAGGTGAAC CCAGATCTCTGTGCTTATCTGCAATATAA CAACACTAAGAAATATTAGGTCTCTCTGT GGTTTTCTTAAATCTA	6	D	—
IM000133	GTATTTCTGTGTCAGAGGAAAAGAGTTTTTC AAAAAACTTTTAAAATTTTATTGTTAG CCTGGACCAGTTTCATAGCAACCTGTCAT CCATATCCTCAGATTCATTATGAGTTTG TCTGCCCATTAAAGATCTTTAAATGGTTC TAACAGCTTACTTCATTGTTTCATTAGTAA AGGGTTTATATCTACACTTTGATATTTGC TTACTCCATACATG	7	D	—
IM000134	CATGAGATGAAAAAGAACCCTTTTGGACTT GAATTTTGTTGCTTCAAATGCGTACTGCA GTTGATGGAAATT	8	D	—
IM000135	AGGGTCCCTTCAACTTCCTCAGAGCCAAG GCTGACTTACTACCGTTCCCAAGATCTC ATG	9	D	—
IM000136	CATGCCCTCGGAAAGTACCTTAAACATAG AATCCCCTCCCTAGTG	10	K	<i>Myb</i>

IM000137	CCAGATCCCATTAAACAGATGGTTGTGAGT CACCATG	11	K	<i>Wnt1</i>
IM000138	CATGACTTCTTTTCATTTCTTCTGTGTGTC TGTCTTCCTGTGTTTGCCTGCCCCCTCTCT TTCTCTTCTAACAGCCCCCTTGAACCAAC TGATGCGCTGTCTTCGGAAATACCAATCC CGGACTCCCAGCCCCCTCCTCCATTCTGT CCCCAGT	12	K	<i>Braf</i>
IM000139	CATGGGAATGTAATGTATTAATGAATATT ATATAAAAGAGGCTAAATAGCTTGGCTTT AATTTCTCACTTTGCCTACTCAATTGAGA AGTTTATGGATCACCAAAAGT	13	D	—
IM000140	CATGTCCTTATTCTAGGAAGCCCCCTTTT TTACCCCTGCCTCTGAGAGAAACAG	14	D	—
IM000141	CATGAACACCCCAAATCCATATGAATACAC ACATAAAATATTTTATTTTCTCTATAATT TATGCCACC	15	D	—
IM000142	GAAAGCATTGAAATATACTGGCCTTATTA ATGGCACATG	16	D	—
IM000143	CATGTGCACACACCCCCACAAATGACCTCA GATGTCAGTGGTACTGAAACTGAGAACT GATGATAGAGCCAGTAAAAATACTGAAAG TGCCTGTTTTGAGAGTTTATATTTTACAA TACTTTAATATCTAACTACACACACATAC ACCTGAAAAGGGCTCAGAATACACAGGCC TGAGATGGCTCTCAAGAACCAGCCTC	17	D	—
IM000144	GGCCTTCCACTGCTCAAAGCTCAGACTGC AGAAAAGGTTGATAGCCTCCAGGGGCAA TGACACCCTTTCTGCTTGAGCTTCCCCC CCCCCTCTCAGGATGTAGTCATG	18	K	<i>Wnt1</i>
IM000145	CATGCCAGTCCACATCTGCTTCTATGACA AATGCCACATCCCAACGACAACTCACTC ATTCTTCCTGTATCAATTTACGCATACAC ATAATACTTTTGCTCAAGGTACATTCATA TTTCCGGCAAACAGACAGCTATAG	19	D	—
IM000146	CATGTCACTCACTTGGAGAAAGAGTTCTA ATTATTTATCACGGCATTTTTCACAACTA TAGAAATAAAGTTAATTTCTTTGGAAATA AAGTTGAAGTTGTAATTTCCAGATGGGCT CAGGTTGCTGTT	20	B	<i>Mm.6055</i> 2
IM000147	CTCCTCCTAAAAGAAAAAGGAAAAAGAAA AGTTAAACCTGCAACAGCATCAGCAGAGC TCACCCCTCCTCACCTGCAGCCCTGGTTG CCTCTCTTCCTTTTCATG	21	D	—

IM000148	GAAAACACTGTTCTGGGTTTCAGGGGTTAC TTAGCCTTGGGAATCAGAGTCTACCCAGAG TCTACCTGCTTCTACCCAAAGCAGGTGGA AGAAGCTGCCCAGGACGGGGCTCAGAGTC TACATTTGAACTCCCTGTGCCAAGAAGTC TGGATAGAGTATAGTGTCTGTATATTCTA AACTTTCTGGAACAACCCCTGCTTACAAT ACTCTTTCCAACCTCTCAGGCCATG	22	D	—
IM000149	ACCTCTGTGCCAGCTTCTCGGACATTTAA CAACTCTGGATCATG	23	K	<i>Fgf3/Fgf4</i>
IM000150	CTGGCAGTAACACACTTAAACTGCTAGCA CCTGGGAAGTGGAAATAAGATCAGGAGCT CAATCAAGGTCATCCTCAGCTAAACAAGA CCCCCCCCAAAAAAGAGAAGATGGC CTAGAAAGAGAACTCAGCAGCTGCTGATC TTACAGATGACTAGAGTTTGGTTACCAGC ACCCACATG	24	D	—
IM000151	CATGCCTGGTCCCTGCTGAGTGCAGAAGA GGGTGTCAGATTCTTGGAACTGGAGTTA TATACAGTCGTGTGTCAGTGTGGTGCTG GGAAGTGAACCTGTGCTCCTCTGCAAAAAC AAGAGGTCTTGGTTGTTGTTGTTTGTGTT GAAACAGGGTTTCTCTATGTGGCCCTG	25	C	—
IM000152	GCAGGAGCCCTTGTGCAGGCCACAACCTG CACAGCTGTACAAGGCCTGCCTGACTGCC TGAACAGATGTGTGGGATCTTGCCCCCT TGTGCAGGCGTACAGATGCAGACTGCTCA GAGACACACATG	26	K	<i>Fgf3/Fgf4</i>
IM000153	CATGGGCTAGACCTACACTGAGTTGTGCT AAAGAAGTGAC	27	D	—
IM000154	CATGTCCTCCACAGCTGAGCACCCCTCAAC TGTCTCCCAGGGCCTCTGTTCTATCCAGG GTCTGCAGGGTCTCTGCCCCACGCCTAGC CCCTGAGAAATCTTAAGCAGTCTGAAAAC TACGCCACTGAACTGCTAAAACCCCTGGAG TCACTGATGGAA	28	K	<i>Fgf3/Fgf4</i>
IM000155	TAGTGCTAGACTCTGCCTTTTTCACCTGGC ATAGATTACCTTTTCCAGATATCCAGG GCACTTGCAAAGAAGCCAGGCATCATCAG GGGTTTGGACTTCCAGCCAGAGTCTGAGT TGTCAGTTGAATGTGCTGCATTTTGTG ATTAGCCCCAGTCTCCGACTCTTTGTG AGTTTAGGATAATAATCACAACAGCACCC CTTCTTATTTGATGGCTAATAAGCTCTAG GCCAGTGTCTTAGCTCCATTCATG	29	D	—

IM000156	CATGTATTCTGAGAGTAGAATTTATACCC AGAGAATACCTAAGAAGTGAAGTACGCC GGGCGTGGTGCCGCACGCCCTTTAATCCCA GCAGTTGGGAGGCAGAGGCAGGTGAATTT CTGAGTTTGAGGCCAGCCTGGTCTACAAA GTGAGTTCAGGACAGCCAGG	30	D	—
IM000157	GCCTGGTGTGGTAGCTCACACCTTTAATC CCAGCACTCATCTCTGTGATTTGCTAGGC CAGCCTGGTATACACAGTGAGTTACACAT CAGCCATG	31	K	<i>Fgf3/Fgf4</i>
IM000158	CGACATCCAACCTTCTGGAAGGAGAGATGG GAAGGGGCATTTGGGGTGCTAGGAAGGGA TGGGAGGTGTCCCTAGAGCAGTGCTCATG	32	K	<i>Wnt3</i>
IM000159	CATGAAATAATGCCTTCAGAACTGCATTA GAAATCACAAATAGCCCTGAATGCCCTCT AGATGCTTTTCTTGAGAACAATTATGTGT TAAAGTCCTAAGGCCCTTGTGAGCCACC ATATGGAAAGGGAGAACTAACTGAAATGG GAGTT	33	D	—
IM000160	ACTGACAAGAATAGAGAGAAGTTTCAGTCA TG	34	D	—
IM000161	GTGTCCTGCTCCTGTCTGGGTCAAGGTCA TAAAAGATGAGCCAAGGCTGACTTCAGTG CCCACCTGGGGAGACTGATGTCTTCACAG GAATGCTCACCTGGAAGGTGTCTCTGGG TGCATCTGTGTCACATTCCGTATAGAAGG AAGAATGCCAACAATACTCTAAAAATATT AGAGGCCCTGAGAGTCCTCAGTGGTATTC CACCAACATCAAAGCTGCATCGTAATATG CCAGCCTGGTCCTCACCTTTCCTGCCCTT CCCAGGAAAACATCAGCCTTTAACCTCAG CCCATAGGGGACATG	35	D	—
IM000162	AGGATCTTATAAAAAATAACAGTGACCCAA AACATAATTTTGGCCATCAAGAATCTCAA AATCAAGTCTCATCCAAGTCTACTTTCT TTATTGTATCTTAAACACACACACGCA CACATCACACAAGCACACACACAAGAATT CACACACATACATG	36	K	<i>Wnt1</i>
IM000163	CATGGTATTCTGATGATAGTACCAACATA CTGCTGCAGCTAGCTGTATCTGGAAATCC CAACCTCAGCCAAGTATTTGTGGTTGAAA TAACCTATACTTCTCACATCAAACAC	37	D	—
IM000164	ACTGTGACCTGAGCACTTCTTGTCTTATC AATAGCTCACGTGCCAGGCCGGGTGACC AGTCTCTAGGATGTTCTCCATG	38	K	<i>Fgf3/Fgf4</i>

IM000165	CATGCACACAACTGGCCCTGAACTTTGG ACTTCCAGGCCTCTGCCTCTCTGCGCGCA CACACACACTCGCACTCCTGTATATGAAG CGTATATGTGTTTCTCTGGGAACGTGTTT TATCAGGTGAAGCACTTCCTTTGTTCTTG CTACCCACCTCCAGGGCTCCAGGATCTCC AGACAGCCAACCCTAAGACAGGCCAGCT TCCTCTGTATCTCTGTGATGAGAACCTTG GCATAGAGCTGCCCTCACCCTCGGGATAG GGCTTATGTTCCCGGAACGAGCCAGGCA CCTCAACAGCTCCTGGGGAGGAATAGGGG ACT	39	K	<i>Fgf3/Fgf4</i>
IM000166	CATGGCACTATGAAGGAAATGAAGATACA AAAGATTTCCCATACAAAGGGTCAACTGT TCAATTTGGCATTATT	40	D	—
IM000167	CATGATAGAAGACCACGTCTGGGATGGGG TAAGGGTTTCTCAGAGTACCTTGCCCTGG GGCCACATCCTAAATCTACAACAAAGCT	41	D	—
IM000168	CATGCAAAAGAATTCCAAATGATTTTACA GATCTTAGCCCTCTAAGAGATAGATATAG CACAAGTCCTGACTCCTGAGGTAGGTACA CACTGACTTCCTTCCACAAGCACTGCCTC AGCCCGGAGATGAAGGTCACATCAATAGA GACAAGTCAGGTTAACCGTGAGCAACCTC AAGACAAGGAGGAGCACAGCATAGGTCGG TGGAAGTGTTTGATAAGCCTAAGGCCTG GGCCAGTCACCAGCATTGCAGAGGAAAA GGAAAAACAGATAGTAGGTGCCTTGGTGT GT	42	C	—
IM000169	CATGCAGTTTACCAATCTTTTCCACTCT TTAAAAAGACAAAAAATATTAGAATACTG GGCTGAGGAATGGCTCATCAGTTAAGAGC GCTGCTCTTTTGAAGGACTCCCGTTCTGT TCCAAATGCCACCTGGAGGCTATCCTGT AGCTAGAGGT	43	D	—
IM000170	AGGAAGTGCTGAATAGAGAGGTTTGGGGA GAGCCCAACAATCTGACCTATTTATACCC TGCCAGGCCCTGCCCATG	44	K	<i>S100a4</i>
IM000171	CATGGTGCTGGAGGATCATCCATCCTGAC ATTCTGGGA	45	R	—
IM000172	CTTTAACCATTATGTTGTGACCAGAAA CCACAGATCTTACCTAGGCTTCAGACACA TCACCCGAGGAAAGCTCCATTAATCCT CATTCATG	46	D	—
IM000173	CATGTATTCTATAAGTGGATATTAGCAAGA AAGTACAGGCTAAT	47	D	—

IM000174	CCTCTGGAAGTCAAGTGCAGCTTTGCTTA TTTGTTTAAGCCATCCACCATCCAGTTAT TAGATCTGAATTCATCTTTTAGGGTCAGC TTTGTGTAGATTTAGGATGTGGCCCCAG GGCAAGGTACTCTGAGAAACCTTACCCC ATCCCAGACGTGGTCTTCTATCATG	48	D	—
IM000175	GTTTTCTTTCTTTTTTTTTTAAAAGAAAC AGTCTCAAGTAGCCCAGGCAGTCCCTAAA CTTATTATATAGCCCAGGACAGTCTTGAA TTCTGAACTCCCTCCTCTACCTCGTAG TCCTGAGACCGATTGCATG	49	D	—
IM000176	AGAGACCCAGAAATACCAAGGTGATTTC AACTGCCTGACCTGGGAGGCAAGCATG	50	D	—
IM000177	CATGTAAGATCTTCACTTTTCCAGTGTCT GTTTGTGCTGCCTTCAAAGTGTGACCTG ATGTAAAAATGTTTGCATCAGCTCAGGTG TATAGAATTGGACTGATTCCAGGAGAGTC AAATATACAGAATATCTAGTGTCCAAGAT	51	D	—
IM000178	CATGCTAATGGAGTTTATTCTTAGGACTG CCTCCTGCATCCATTGATTGACTTAAATA TGTGCACACT	52	D	—
IM000179	ACTAGGTGACTGTCTCAGGGTCTCACTGT GTAGTCCTGGCCTAGAACTCTCTATGGAG ACCAGCCAGACCTCACACTCAGATCCAGA TGCTCAGCCTCCTAAGTGCTGGGATTAA AGGCCAGTCCCACCATAACCCTGCCCCTGT TTCTGACATTTGAACCCCTCCTTTAGACA GTAGGGAAACTGAGGCCCTGAGATATGAC ACTTTTAGGGGCATG	53	R	—
IM000180	AAACTTCAGAAAGCGGGGCTACCAAGGA GACTCAATTAAGATCTCTCCTCGATCTTG AAACCATCCCCAGCCCTTCGCAAAGCACA TTTGACGGACAGGGTTCTCTGTCTTGGG CAACACATCCCGGCTACGCTCTGCAGGGT GAAGCTGTTAAGAACGTTCCATG	54	D	—
IM000181	GATAAGCCTCTACAAAGCTGGAGAGGGCA GTCCAAAGAACTTGAAAAGATTAAAAGA CAGTGCCTAAGGACACAAACGTTTTTCCA TAAAGAGCCTATGACATATTTTACTGCTG CTAATGAAACTGACCTTGAAGGAACAAGT GTTTAGGGTTAGCCTAACTTTGGAATTG GTGAAGGCAATGTGTGCTAGACAAATT AGAGAAAGAACTCAACAGATGAGTCAATG AATTGTTCTAACTAGCTTGACTTAGGAT TTTCAGCACAGGAACAAAAGCACATACTG TCCCTCTGGTTGGCATG	55	D	—

IM000182	CATGGAAAATGATAAAAACCACACTCTAG AACATATTAGAGGAGTGAGTTACCCTGAA GAACACATTTCGTTGGAAACGGATATTGTG TAA	56	R	—
IM000183	CATGCCCCGGCTCTATTACTATTTCTTTCT TTCCTTTTTTGTTCAGGATCCAGTTTCCT TGATAAATTTTTCTTGAATGTTGTTGTTG TTTTTCTTTTGCTGAGTTTTCTTCAAT ACTGCTGCTTTTTCTCTCCAGGTTCAGGA TGAGA	57	D	—
IM000184	CATGCTGTCACTAAGCTGTGCTCTTCCAA GGAGATGAAGAGACTAGCTGGTACCCTTG CTATGCCAGGCTTTCTTCTGTTTATACA CACCTAATG	58	D	—
IM000185	CATGATCTAATCTGAACTTGATCCCAAC CCTTTATAACAAGTGAATGTGTAATCTA AACTAGTATAAGCTCTTGAATAATAGCTG AGTGAATTGCCTTTGATACACGTTTCCAA ATTAGTAGCC	59	D	—
IM000186	GTCAACCACAGCAGTACTGTTACTTTCTG TGGGGGAGACGTCTCCCCTCCTCATG	60	D	—
IM000187	GGCAGTGAGCTTGCCCACTCTGCTACAGGACCTCGG TGACCCACTATATACAGCCCTCTTCACTACGGCTCA CAATCGGAGTTTAAGACCCAGTGAAGTAAACCCAGC AGGACCCTTTACAAAGCCAGGACATG	61	D	—
IM000188	CTTGTCCAAACCAGCTTAGTCAACAGCCT CCTATCTGGGCTCCATCTTACCCTCCTCA TCTAGCTGATGAATGTACCTGCCTTCTGT TCCCTTCCTCCTGGTCTGAGCTGAGCCTT CTTGGGACTGAGAGCCTTCATCCACCACA GGCAGACTATCTTTAGATCATCATAGCCC CAGGTCTTCATTGCAGTGCAAAAGTGCAG ACCTTACATTTCCATTTTTATGCTCCCTT TGTAACGGCTCCTTACCGGACTGCAGCAT AAGTGGCTGAGTATCCAATCACAATAGAA CACTTAGTTGTTTGCTTGTCTAACTCTCT CAGTTACACCATTGAGTATGTTACACAGG GCTGCTTTGTAGCTGTCACTGAGGCCACA AGGCAAGGGGACTAAGGCAGGACTCAGAT GAGCCTGTTTTTACTTCCCGTTGTCCCTT TCACTTTGGGTTGAGCATG	62	D	—
IM000189	ATATAGACTCAATCAAGGTATTATTCTGG AACAAACAAC TAGTAACAAAAATAGTGCA ATTGCAAGTATGATAACACAAGGCAGCCT TTACCAGCTTTGTGCGGAAGGAAATTGTTT TTTGAAATCTGAATTCCAGAGAAAAAGTC AAATGTAACTAGAAAGTGTTCATG	63	D	—

IM000190	CATGTATGTGCGTGTGTGAGTGCATCAAC ACAAGTGCATAGATGCGTGTGTGTTTGTG TGTCTGACTGTTTAAAGTAGGTGGCATCTG TCCTAGTCCTGACTTTTGATAAGTCTACA CGTTTGATAAGAGGATCTCTCTCACCCT CAGGTTCTCCCCCACCTCCACCCAGT ACACAGCCATAACTATAAACTCCCCACGC AGATGAAGCCCCTCTGATCCCATTTTAGG GACATAACACCCCCCTCCAGACTGAGCT AATGCCTTGGACCCTCCAAAAGTATCTG AACCTCTCTGACCCTGCCCTCCTCCAG CACAGGGCAA	64	B	BF16381 0
IM000191	CATGATTTTCAGTTTTCTTGCCATATTCC ACGTCCTACAGTGGACATTTCTAAATTTT CCACCTTTTTCAGTTTTCGTCGCCATATT TCACGTCCTAAAGTG	65	R	—
IM000192	AAGTATGTCTGCTATGAGTCAAAAGTCTT ATTTTGCATCACATG	66	D	—
IM000193	CATGCCGCAGTGGCCAGCAGCCCTGGTTC CAGCATTCTCAGAGATAACAAGGAGCCAG TGACCCTTTCTTCAAGCACCAAAGAAAAG CTAACCGACCCACAAAGACCTGAGTATG AATGGTTTCTGCAGCTAAGGCACCTCCTT TGAGGTCAGCGCAGTTCGGGGCTGAGAAA AGAGCTTGGCCTGGCTTAGAGCCTTTCTC TGGCTCACTGTCCCAGCCAGGACCCATCC ATCAGCCCACAGTGGGGTGGCATAGTGCA ATCCTAGAGAGATGTTCAAAGGGACATAT C	67	K	Fgf3/Fgf4
IM000194	ATTCTCTGGGTTTTCTGTGGTGCCTCTGG ACCCCTCTCGCTCCTACAATCCTTCCTCC CCATCTTCCACTGCTCTGCCTAGTATTTG GCTGTGAGTCTCTGCATCTGTTTCCATG	68	R	—
IM000195	CATGCCCCCTCTCGACCCTGGGAGCATTCA CCATCTTTATAAACTGATTCTTTCTGGGA AGATGATG	69	D	—
IM000196	CATGAAACACACTTTTAACTTTCCACATA CTTTTTAAAAGTGTACCTTCCCATTTTTT CGCCCTAGACCCAAATTGGATGTTTCTG GCTCCCTCTCGTTCGTAGCTTTCCTGTGA TGTAAGAACCTCTTAGAAACACACC	70	D	—
IM000197	GTTTCCCACGGTGAAGAGGCAACAAGA TCCCTTGGGCCTGCCTTCTTGTGGCACTA ATCTTACTCATG	71	D	—

IM000198	ATGTGGTGTTTAAATGAGAATGTGGCCCA TAGGCTCATATGTTGAATACNTATTTTCC AGTACTTGAAGTATTTGGGGAGGACTAG AGGTGTGACTTTTTGAAGGGGTGTATTA TGTGGATGTACTAAGAACCTTTAAATCCC TCTGACCATG	72	D	—
IM000199	GCATCATAGTTGTACCATG	73	D	—
IM000200	CATGGGTAAACAGTGGGCCCTAAACTTGA ACTAGAAAACCTTAAAGATG	74	K	<i>Wnt1</i>
IM000201	CAAGTCTGTCTGTCTCCTTACTAGCCTTT TGCTGTTCTGACTCTCAAATGGTTCCTTA ATTGGCCATTTGTCCCCTAAATTAGGGGC GATTAGGATCAACACTCAAGCAATGTTCC AGATGGGGTCTGACGTTCCCTCACTGGGGT CCCAGGGCTCCTCTGACTTGGTCACAGAA AGGTCAGCCCTCTGACCTGGCATAGATGT CTGGATGACCTCTGACCTCAGCTCATAAA CCTGACTGTGGAGATTGAGACTGGAGGGA CTCAGGGCAGTGGCTCACTGGACAGTGCC AGGGTGTGCAGTGGTAGGCAGACTTCTAT GTCAGGTCTCCTGTGCCTCCATG	75	K	<i>Fgf3/Fgf4</i>
IM000202	GCACATATCTGAGCATCTCAAGAAGCTGA AGCAGCAGAATCATCCGCTCGAAGCAAGT GTAAGCCAATAAGAAGACTCTGTCTCAGA AGAAACTGAAACGAAGAGAGACAAAAACA ACTTCTGGGGCTGAAGAGATGGCTCAGCA ATTAAAAGCCCATTCTGCTCACTCAGAGG CCCTCTGTGAGCTGTCTCCAGATGTTTAA CAAGCACAGCTAACATTGGGCATG	76	R	—
IM000203	CACATTCAATTAAGAGACTTTATTAAAGC TCAAAGCACATATTGCACCTCACACAATA ATTGTGGGAGACTTCAACACACCACTTTC ATCAATGGACAGATCATG	77	R	—
IM000204	GGGGAGAGGCTTCAATGAGCCCCCTCACA TTTGCAATTTAAATAGCAGCATCAAGCGCT TCGCGTGCCACACACCAAGTGGGCTCCCAG ATGTCAAGCCGGAGTCAGTCAGATGGCCA GTGCCCAGCTGTCTCCCTATGTCGTGCC GGAGCAGGCAGTGACCTTAAAGAGACAGC GCTCACCGCTCCTGGAGCCCCGACTCTGGG TCCCTCATG	78	D	—
IM000205	CTTGTCGCGCCACCCGCTGCCTCATTAC CTGGCTCACTCACTAACGTGAAAGCCTTA CAGAAATCTCCAGGTCCTCAGCGGGAAAG GAAGTCATCTTCTTCTCATCTCGGAGG ACAGAAGTCGGATGGTAAGCATCTGTGCT GTGCTCCTCTAACTGTGACGCCGGGTTC CATCACATG	79	K	<i>Braf</i>

IM000206	ATATAGTATGACTGCCTCAAAACAAAACA ACAACAACAAACCCCAAGATATCTAAAG GAGGAACATTCCAAAAGACAGAAATGTCC ATAGACCTTGACAAAGGAACATG	80	C	—
IM000207	GTCAAGTGGATGTTTCTCATTTTCAATGA TTTTTCAGTTTTCTTGACATATTTACGTC CTACAGTGGACATTTCTAAATATTCCACA TTTTTCAGTTTTCTCGCCATATTTACG TCCTAAAGTGTGTATTTCTCATTTTCCGT GATTTTCAGTTTTCTCGCCATATTCCAGG TCCTTTAGTGTGCATTTCGCATTTTTTAC GTTTTTTAGTGATTTTGTCATTTTTCAAG TTGTCAAGTGGATGTTTCTCATTTTCCAT G	81	R	—
IM000208	CATGAAGTTAGAATAATTGGGATAAAGCT TTTATCATTATCAATTGGTTTTGAAATTA TTGTATTGATATCTGTAAACTGAATATT TATTGGTACATAAGTCTGGTTATGGTTGA CTACTTTAAGTTTTAAGAGTTTTGATTCT TCCAGGTAAATGGGTGTTGTAATG	82	R	—
IM000209	CATGCAGCCGGGGTGGGATTTGAAGATTA TGCCTAGTGAATATTTAATATTAAACACG GTGTGATCGAATTGATAGCTGTTGAAAAC TAGAGCGAAACC	83	D	—
IM000210	GGACAGGGTCTCTCTCTCTTGTGTTCAT TGTTTCATATATCATCGTCGGCCTGCTTA CAGACTGCATTGTGTTCCCTGTCTCTGC CTCCCATCTCACTGTAGAAGTAATGGGAT TACAGATAGATGCTACTGTGTCTGAAAGT TAAATTCCTAGGCCCATG	84	D	—
IM000211	AGTGGGAGGGAGCGCCACTCTTGAGCTA GGCAGGAACTGTTGTTACTTCAAAAATA ACAAGACAATCTCACATTCCTGAGCTGAA GACCAGATGCAGCCAGGGACAGGGTTCTG CCCTGGCCACTAGATGGGCTCTCTGGCCC TGCTAAAGCACTGCACAAAACCTGGACGAG GTGCACCAAGAGTCCCGTGTGTTGGCCCTC AGGGCAGACTAGAGAGCAGGACTTTCTCC TGGGAGCAGAACTGAGCCTGGGGTCTTC ATG	85	K	<i>Fgf3/Fgf4</i>
IM000212	CATGCTCATAATTCTGCAGTGCCTTCTCA TAACACAGGATAAAACACTCTAACCTTTA ACATTATACTTGAAAACCTTATGTGGTTTT TTCTTACCAGAGTCATATCAAACAGTCT CCCTCTCCACTCACAAGGATCCAGTCACA ATGGCCTTTTA	86	D	—

IM000213	CTGTAGGACCTGGAATATGGTGAGAAAAC TGAAAATCACGGAAAATGAGAAATACACA CTTTAGGACGTGAAAATATGGCGAGGAAAA CTGAAAAAAGTGGAAAATATAGAAAATGTT CACTGTAGGACATG	87	R	—
IM000214	CATGGCGAGATTCTGTGTCCAAGCTGCCT CTACTCGTGACATTCCAAGATGCCTCTGA GGTGGGAACTGTGAAATAGGACAGAGCCC CACAGTCCCCTCTT	88	K	<i>Wnt3</i>
IM000215	CATGGGGGGGGGTACCAAGAAGGGACTGC TGTGATTGGGATGTAAATAAAATAAA TAGAATAAAACAAAACCCAAAAACAAACAG AAACCTAAACTCAATAACTGCAGAAATGA CTCTTGCTCTTTTCTGGTAAGGTTAGAAG CAGGTTACAAATCTATATTAGAGATGGAG GCATTTACACCAGCATAGGTATAGGAAG TAGATGAAATGAGGACTACACTAGAGTCT GTTTGTCAACAACCAATTCTGAGTGATTTC ACTGAGATAT	89	D	—
IM000216	CTCTGAGAAACCTACCCCATTTCTCCCTCC TTTCTCCCATAAGCAACCACCTCCACAGC ATTATCAAAAGACTGCTGACAGATTGGTG GCTCAGCAGGGAGAGTCAGAGCTGTTTCT TAGGTCTAAGTTGTAGCTCCACAGTAGTA TGTTCTCCATG	90	D	—
IM000217	CATGGAACACTCAAAGCTGGCCAGGGCCC ATTTACCAGGTATCCTTTGCCCTTCTCAGC TGATGGGCATCAACACATTAATTACATA TGACTCGTTTGTGT CATATCAATAGTAT	91	D	—
IM000218	GTGGTTTTTGTGGTAGAGAGACACAGAAG AAACTGAAGTCCTTGGAACATAATTATCA CTGTGGTTGAATGTTTGTGTTCTTATAAC ATCCTATGTAGGAACTGAACCTATAAAAG TAGTGGCTCCGAAGGTGGTGTCTTAAAT GTGAACTGGGCTACAAGATTTTGCCCTTG TGAATGGCTTTATGGAAGAGGCTGTCACT TTTCTGTCTCTTCTCCATTATCTTGGAA GACACAACAGTTCAAGGTCTCATCTGGGA AACAGAGACCTTTACCAGACCCTAAATCT GCCAGTGGTGTCTTGATCCTGGTCTTTCT GTCTTAGGAGCTATAATGCATG	92	D	—
IM000219	GGCCACAGCCAGTCCACCTGTATGCAGCT GGGTGCTTGAGTGGCCCTGGTAGACAAA GTCTCCATCTTGCCATG	93	K	<i>Fgf3/Fgf4</i>
IM000220	CCTTAGGGCCCCAAAATCCTTCTCCCTCCATT CTTCCATAAGAGTCCCCAATCTCCATCCA CTGTTACCTGTGGGTGTGTGTATCTGTC TAAGTCAGCTGCTAGGTGGAGATGCTCAA AGGACAACATG	94	R	—

IM000221	GACAGTAAAGAAGACAAAGAAGTGAGTAG AGCTGGATGAAAAGTAGGAAGTTCAGACA AAGACTGCGGGAATGANGTGTAGAGTCTA GAGCCCAAACAGTTAAACATG	95	D	—
IM000222	CTGCTACATTCTTAGCTCTAGCTAACTAG CATCAATTGTCCCAACCCCTTCTATGTAT GACTCCAAAGCCAGTGTCACATG	96	R	—
IM000223	CATGGTCTCTAGAGCTAAGAGATACCAAT GCTGCGGCAGGCAGTTTTTATTACAATCA TTACAGTTTTGACAGTGTCTGGCCGTGTG CCAAGGCTGGCCTTCATCCCTGAGCTCGG TGATGCTTCTGTCTGCTGCTTCTGGCTCG TCACAGCTTAAGAAAGTAGCTGCTTCTC	97	D	—
IM000224	CATGGAAAATGATAAAAAACCACTGTAG AACATATTAGATGAGTGAGTTACACTGAA AAACACATTGTTGGAAACGGGATTTGTG TATATCAATGAGTAGTTA	98	R	—
IM000225	CATGGAAAGATAATGTGTAAATTTGGGTT TGCCGTGGAAAACTTGGTTTCTCCATCA ATGGTAATTGAGAGTTTGGCTGGGTATAG TAGCCTGGGCTGGCATTTTTGTCTCTTA AGGTCTGTATGAAGTCTGTCCAGGATCTT CTGACTCTCATAATGTCTGGTGTAAGTC TGGTGTAATTCTGACAGGCCTGCCTTTAT ATGTTACTTGACCTTTTTCCCTTACTGCT TTAATATTCTA	99	R	—
IM000226	GGTAAGAGTGGGAGAAAATGGGGTGGGG GGTGGGGACACTGCAGAAACCTGGGAGAA AAAAAATCCAATAAAATCAGGAAACACA TG	100	D	—
IM000227	CACCCCATCCCGCAGTCCCAGAGGGAA CAGTCCCAGCAAAAATACATG	101	D	—
IM000228	CATGGAGATGCAATGAAAGCACACAATAT TGCTGAACCAAACAGAAAGCTCAAACTA GGCACAGAAAAGAGATACAAACACAAATC TGAACAAATTGACCTTCTCCCTATAGCAT AACTAATATCTCAGAGATAAAAGTGGTCT TTATATACCAGGGCGAAAGAGGTCTAAAA AGAGAGGAATAAAAAATATGGCATATTTT CTGTCATATGCAGAACCTATATGAGTCTT TTTGTGTTGTTCTTTCAATACAGCCTATG TAGCTCTAGCTGTCCTAGAACTTACTTTG TAGACCAGGCT	102	R	—
IM000229	CTGTTCTACAATGCCGGTTTCCAACGTAT GTGTTTTTCAGTGTAACCTCACTCATCTAA TATGTTCTACAGTGTGGTTTTTATCATTT TCCATG	103	R	—

IM000230	GACAGGCTCCAATCAGATATACCAAGGGC AGGAAGCACGTGACAAAATCAGATGCCTG GAGACAAGTGTAAATAAAGAAGCAACAGA AAACAAGGTTACTTGGCATTGTCAACACC CAACTCTCCCACCATAGCAAGTGATGGAT ACACCATCACACCAGAAAAGCAAGATATG GATCTAAAGTCACTTCTCATG	104	R	--
IM000231	CATGGGTCCCTGAAGGGTCTCTCCTTTAG CAAACCCCTGTACAGTTGAAGTGANTTTT CAGGTACCCATTGGTCTTAGC	105	D	--
IM000232	CCCCACTCCTCACAGGGCTCCCCACATCT GCCCTGGGACACCCCACTCCTCACAGGGC TCCCCACATCTGCCCTGGCACCCTCCAT TTTTTCAGGCACCTGAAGTCCCTACTTTCT AAAGGCCATTCTTCTACCTCAGGTCTTGC TCTAGGACTGTCAACATG	106	K	<i>Fgf3/Fgf4</i>
IM000233	CAGGACAGCCAGGGCTACACAGAGAAACC CTGTCTCAAAAAACAAACAAACAAAAA AGACCATTATGCATTCTGCGGCTCTGAC ATG	107	R	--
IM000234	CATGGGCAGCACCTCGTGGAACTATTA TAAGTGTCTCCAGTCAGGTCAACAGCGT AAGAT	108	D	--
IM000235	CCTGTACATTCTGTGTTAAGGACAGAGGG CCTCCTGCATG	109	K	<i>Fgf3/Fgf4</i>
IM000236	CATGGAGGCGCAGGAGTTATTGTCTAAAG TTGTGAAGATGAAGCCTAGATTGTATTGG AGATCCGGGTAT	110	D	--
IM000237	GCAGATATTTCCACCTCTGCCTTCCACAG TCCTTCCTCCCATG	111	C	--
IM000238	CATACGCTTACAATGTGTTGTTATTTCTG GTTCTCGTCTGCCTTCTTTATAAAAAACAA ATCCACTAAGGTGGAGTAGCCAGCCTTTA CTCAGGGACTGTCACCATG	112	D	--
IM000239	TTCTGTATATATTGTGTGGTCAGAAAACC GTGGTTTTCTGGTGTCAAGAGTTAACAC TTTCAGTAATCACTCATTCTAAACCAGAC AAACCTTTAATCTTTCATCTGGAAGGTA CTCATTCAAACCAATGCTCTCTTAAACC AGAGTATTTAAACAGCCAACTGCATCTTC AGGGTTTCATAGAAAATCAGCTTGATCTA AAATAGTCACTGAATTCTGATATCATAGA CATG	113	D	--

IM000240	TCCACCCACCCACCCACCTGCCACCCAG ACAAATGTTCACTGAGCATTATATACTC CATTCACCTCTAAGTACAGAGCCTAAGAA TATGAGAAAATCCTCATAGCAAAGAAATG CCTCTTGCAACTCGAGTAAAAACTCGAGT ATGGGATGGAAGAGTTGAGAAAACAGATG ATAGTATGAGAGCCTATG	114	D	—
IM000241	AGGAGCCTAGCAGAATTGCCCTCTGAGAA GCTCCACCCAGCAGAAACAAATGCAGAGA CCCATCGATAAACTGGACAGAGCACAG AGTCTTGTGGAAGAGTTGGGGGAAGAATT GAGGAACCCAAATGGGATAGGGACTCCAC AAGAAGAAAAAGAGAGTCAACTAACATG	115	R	—
IM000242	CATGTCCTACAGTGGATATTTCTAAATTT TCCTCCTTTTTTCAGTTTTCTCGCCATAT TTGAAGTCCNAAAGTGTGTATTTCTCATA TTCTGTGATTTTCAGTTTTCTCGCCATAT TCCAGGTCCTACAGTGTGC	116	R	—
IM000243	CATGTGGAGGCCAGAAGTCAACATATAGT CTCCTTCCCAATTACTTGTCACTGGAGAG C	117	D	—
IM000244	GTTCAGTAGCCAGCAGGGGGATAGGACC AGCCCAAATTTCTCCCTTTGCTTGGCCTTG ACTACTAGTCTGGGAAGGGATAAGTGGGC TAACCAGAAGTCTTCCACATCTCTAAGTG ATTAAAAATGGAAGACGTGATCTCTGGTC ATTCATAAACAGGCATTTCTCAAAGTTGG TCTGTGCAGTTTGTGGGAAAAAATGAAAT GTACTCATG	118	D	—
IM000245	CTACAGAGTGAGGTCAAGCTCGAGGATAG CCAGGCAGGGATGCACAGGAAACCCCTGT CTCAAAAATCAAACCAACCAACAAACA AAAACAAAAATGGAAGGATAGAAGAGAGA TAATCCATG	119	D	—
IM000246	CATGTACTGAATCCCCTGAAGTTGATGCTG AGCACCATCTTGTGCTGTTCTACCGCATT TACTGGGG	120	D	—
IM000247	CATGTGTCACTCAAAGGCTGCTGAGAAATC AGGCTGTACCTGTATTCTAAGCCATCCA CAGCCATCCTGACCCACAGCAAATGCTGG CAGTCGCCCCACAGCTGGACTCCGTTTCCT CCCTCCACTCCTATAGCCGAGGCTATCCA CACAGGCTATTTCAAGTCCCTAAGCCTTG CTACCCCTTATGTATACATTGAGGACAATG AT	121	D	—

IM000248	AGAAACCACTGCCAAATCAATACATTTTA ATTGGAAGTGTTTATGAAGCCCAGGAGAG ATCCCTAAATGTATTAATTGCTTCCTGAG GAAATATAAAACTCACAGTTACTAAAGCC ATG	122	C	—
IM000249	ATCTTCTACACAGATGAACTGACAAAGT ACAAATAAAGATTATATACCAAATGAAA AAAAGTAAACAGCACACATTTATAGATGC ATCTAGCATCCCCAAAGCTCAACACCAT CCATACTTGAAGACTGCAGTGGTCCCTCT AGACAGTATGCTCCAGGTCAGCCCTCAGC ACTTGAGAATAAACAGCTTCATTTACTCA GCCTGTTGTCAGGATCCATG	123	K	<i>Fgf3/Fgf4</i>
IM000250	ACTGCCTCAAAACAAAACAACAACAA AACCCCAAGATATCTAAAGGAGGAACATT CCAAAAGACAGAAATGTCCATG	124	C	—
IM000251	CATGAGCTGTCGATAGTGACCTGCAGTCAAGGAAAT CTGAGGGCTTCCTAATTACAGAGGAGCTCTAAATG AGAGTAACGCGCTCCACAAACCCCTCACACTCGGT AAGTGTACGGTGACAGATAAT	125	C	—
IM000252	GCCGCGTATGTGTTTCTTTTTCATAGAAGAATTAGC ACATAATGGAATGTGCGTATCTGAAGTGCAACTG AGGAGTATTATTATTACATACCTTTACAAGATATC TTTTCTCAGGGAGCAACCTGAAAACATAAGGAGAAA AACATAAGAACTGCCACTCTAAGGTTGGTGAAATG GCACAGCCTGGCGGTAGGACACACACATG	126	D	—
IM000253	CATGGAGAAACCTGGGCTTATTCAAGCAGTTTCCTT TGTTTACCCTGCCAGGGTTGCCAGTGAAGGGGCTC CTCCATCACTAACTAAAGGTCTTATCCTATGCTGGT TCCTCTCCACCCACCAT	127	D	—
IM000254	TATAGGAATAGAAATTCAGAACTTATCAGTTTGTTT TGCTTCAAATGTCAACACATAATTTAAATTTACAAA CCCTTGACATTTGCATG	128	C	—
IM000255	GAAGACAAAAGATGTGTCAAATACCTGGGCAAAAGG GGGTGGTGGTGCTCTTTTCCAACCTCGAAAGACA CCTCTGCTCAGCACACTAGTTTCCAGGTTCTTGGGT TAGGATTTGGGTGAGATTGGTCGGCGATGTTTGGT TCCTCCATTCTGCTGCTTCTCCCTGATACATTGAGT TACAGCAGCCACGCGTACACACTCTCGCACATG	129	K	<i>Wnt1</i>
IM000256	GAAGAGGAAATAAGGCAATAGCTAGACTGGAAAAAC GAGCCAGCCTAAGAAGCTGCAGAGTAGTCTGTGGGG TTCTGCTTTGGTTAGCTGCCTTTAGTGCTCATG	130	D	—
IM000257	CATGGATAGAGGATGGAAGTTGAAAACCT GCTATTAAGAACATAGCCCTGTCCATTAG TGAGAGTG	131	D	—

IM000258	CATGTGGCCAGGGGCACTTGGAGCCTTAGATAGCT GCCTTTATGGCTCCTGGTGGCCTTGGATGTGGGTGG GTGACAGGAAACAGGAAGAGCTGGATAGTGGGGGT CCCCAGGAGAGCTAGCTGTGCTCTCTATCACTTTT GCTCTCCTGGGGTACCCCGTCTCAGGGGAAGGCC TGTGACTGGCTAAGCAACAAGTGTGGGCTGAGACCT TTCTCTGTGACACTCTGGTGCTACTCTGGCCATAGC ACAGATCTCTAGGAACGCACTCT	132	K	<i>Fgf3/Fgf4</i>
IM000259	TATATGGATATGTTTATGTGAGGGTAGGCACTCCTG GAGGGTGGAGGCATTAATTAGATCCTCTGCAGGTGA GCCACCTGACATG	133	D	--
IM000260	ATATGTGGACTGTAGTCATCTGAACATCTGTAACA AAATATATAGATTAGGAGGTTTAGACAGCAGACATG	134	D	--
IM000261	GTGCCTCTGTCTGCCAAGCTGGTATTGTAGCATG	135	D	--
IM000262	ATTTGTGACATCTTAGGAGCTTAGGTTGGTCTTCGA GACACAGGGCTGTCCCTGTAAAGCAGGTTCCATCA GTGACTCCAGGGTTTTAGCAGTTCAGTGGCGTAGTT TTCAGACTGCTTAAGATTTCTCAGGGCTAGGCGTG GGGCAGAGACCCTGCAGACCCTGGCTAGAACAGAGG CCCTGGGAGACAGTTGAGGGTGCTCAGCTGTGGAGG ACATG	136	K	<i>Fgf3/Fgf4</i>
IM000263	CATGACGACTTGAAAAATGACGAAATCACTAAAAAA CAA	137	R	
IM000264	CCTAAGTCTGACCGTGCCACTTCCCAGTCTTCCCTA CACTTCAATGCTTTTAGGCACAACAAATTTGTACCC CTCATG	138	B	Mm.1028 99
IM000265	CCCCCAGCGTGTCCCTCCCGGAGGGAGTCCCCA GTGTGACATG	139	D	--
IM000266	GTTTAGGTGATAGGGTACTTGCCCAGCAGTAGGTGG TGCCCAGGATTCTATCCTCAAATTCACAAACAGA ACATG	140	D	--
IM000267	CATGTTGTGTAGATACCTACATAATTATAATTCATA ACTGTAATTGCTAC	141	D	--
IM000268	CATGGGTTTGAGCCTTGTCTCTGAGCTGGAGGAAGAG AGTGACCCAAAGGGACCTTGGTAGCAGCCAGGGATG TGTTGGGGAGCAGAGAACTTTTATGAACTTCAGTT TCAGTACTGAAACTTCCCTTTCCCTAGACTTCCTTT G	142	D	--
IM000269	CATGGGACAACTCCTTTTCTCTGGGTGAGGGGA GAGAGACCTCCTATCTAACTGTATAGGCCATTGCT GTAGCCCTTAGCTCACTTCCGGGGCGGGAGGAGGA GGTTAAGACCCTAT	143	D	--
IM000270	CATGAAATGAAGAACAGAGTAGCAATTTGGGGAGA AAAGCCTGCCGAGCGGACTTAATCTTTCCCAAGTGC TATCAGT	144	D	--

IM000271	ATGCTTGTCTTTCCCGCCATTACCTGCTTTTGTTT GAGATAATAGTTTGTACTTTATCAACTAGTAGCG ACTAGTTTACATTGGTTTCATAAATAAGATCCATT TTAATCTGAGTTTCCATCCTTGATTTATTTTGATT CATATTTTAATTGTCTAGTTCCCATCCCTGGGCAGG ACTTTTGGGAAAGTCTTGCAGGTGACTATGTTGAG AATGATTATGTTGTATTAGCACAGGTACATTGAC AGTGCTGGTTCCTTCTGGAGCGCCTCGGGTGTGGGT CCTTTTCCTCAGC	145	D	—
IM000272	CATGAGTTTGATTATTTCTGAATTCTACCTCTCTT GGGTCTATTTTCTTCTTTTGTCTAGAG	146	R	—
IM000273	GGGATAAGACTGGATAGTAAGCCGGGCGTGGTGGTG CATG	147	D	—
IM000274	CAGAAGGTAGTGTTCACAACAGTCCTCCCGATGAT CAATTGTTTACACTAAACCATATAGGAATTCACCC TGAGAGGAGTTTCGAAAGCCTTCAAACCTGTACTG ATATAAAGCAAATCTCTTTGGATTCCCAATCAAAA TGATTGGCAGAACTTTAAGGCCCAAAAATTGTGT CTGAACAACCCCTCTGAGCCAGTTTGTGTAGCTTA AATTAAGGGCCATG	148	D	—
IM000275	CCTCAAATAAGAAGCATCCATTTGGAAGCTGCTGG GATTAAGGGAGTATGCCACCACCAGCTATGGCA TTTTTTCTTTAATTTTACTATTTTGTCTGTAT ATTATGGTTTCCAGTTTGTGGGTTTATAAGCTTT GAGTGTGTTTCTGCATG	149	D	—
IM000276	GTCCACTTAGGACGTGGAATATGGAAGAAACTG AAAATCATG	150	R	—
IM000277	CATGGTCAGCTCTCACTGCCCCATCCCTGTCTCCA GTTACGCACTGTATCCTGTGTCTTCTCTGTGGCT AGACTCTTCTCTGGGGAGGGGAGTCTGTATATC GATGTGTGCTCACGCACATAGAGGCTAAGATTAAAT CTAGGTGTATTCAATCATCGTCTCATTGC	151	D	—
IM000278	CATGTGTTTCTGATTTTAGTTGGATTTTTTTCTC CCAGGTTTCTGCAGTGTCCCCACCCCCAC	152	D	—
IM000279	ATGGTGTCTGTTCATAGCAGTAAACCTTAATAAG ACACTGATATAACTCACCTTCCAGCCTCAAAGTC TCTACCATCTCAGGATCCACTCACTCATTACCAAA CTTCATCAAATGCCACTGTGCTATCATCAGTACAG AATAAATCATG	153	R	—
IM000280	CATGAGACTGTCAAGCTCCTGGGATGGGGACCTT ACCAGAAAGCCACCAAATCAGAGGCATCCCTGTTTG GTGAGGGTACATTTGTTTTTCCCAGGCCCTGAGTG CCAGGCAGGAGCAGGCAAAGTTCACTGGGAGGATG CCCTGGAT	154	K	<i>Fgf3/Fgf4</i>
IM000281	GTTTGGTTCTTTTCAAAGAAAAACAAGGTCATTG CAGCTTTTGTACCATGAGGTGATGGTAGGAATTG AGATATATAATCTACTTGAAGATATATATTATGGCA TG	155	D	—

IM000282	CCGCTGCTCTCTCACCAACCCAGTGTGTCTGCTTTT AGCCCAGACGGGGGAGGGGTAAGGGGTGGTCTGT CTCATG	156	K	<i>Wnt1</i>
IM000283	GTGTCCCTCCTGTCGTTAGGCAGTACTTCCAAATCA AACCATG	157	C	—
IM000284	AGCTGGTACAATGCTTAGAGCAGAGCTGCAGAAGCA ATACAAGAGATCCTGGCTCAGCTAGGTGCAAGCTGG AATAGACTCCTGACAGTTGTCCTATGAACTCCATAC ACAGGCATG	158	D	—
IM000285	ATGGATCCCTGGGGGCGAGTCTCTGGATGGTCCTTC CTTCTGTCTCAGCACCAACATTGTCTCTGTAATC CTCCATG	159	R	—
IM000286	CATGATGCACCTTAGCAATTCTCAATTGAGACTCAA GTGAGCCTAGGCTGTGACAAAATGACTGTTAAACT	160	K	<i>Fgf3/Fgf4</i>
IM000287	CATGTAAAGCTAGTTCAAAACATACTAAATAATTCA GTTGTAGAAGAGGTGAGGTTATCTCACTGCCAGGAT AAGCTATTGAACAAGCAAGGGTTCTCACTTACTGTT TAAGTGGAAGTGTTTCTTACTTCAAAAAGTCATTA ATGAATTTTAAGCTGCATAAATATTAGTTATT	161	C	—
IM000288	TAAGCTTTTCTCTTACACAATCCCCGGAACCCAC AGTTTAGGTCACAAAGACCCAGGCACCTATTCCTAG GCCTGGTAAGTGGGCACCCACCATTACAAAGAGCT CAGCATTGGCTCACACATG	162	D	—
IM000289	CATGAAGATGAACCGGGCTTGTCTCTGGCAACTA GGCTCAGAAAGGATAGGACCACCAGCCGAGTAGCTG TCAGATGGAGCTGAAGACCTGAGGGAAGAATGCTT GTGGGAAGAAGCTGGCTCCTTTGGTTTGTGTGTG CTGGTTTGTGACCGGATCTGTCTGTGTGACCTAC CTAACAT	163	K	<i>Wnt1</i>
IM000290	CATGGACTTAATTTTACTGCATTTGAATTATGGA ATATATATGAAAAGTCTTTAGAAAAGGCAGAGGAC GAAAAAACCAAGAACTTTAATTATCTGAGACCAA GAAACTCTTTAAGAAAAAGCAGTAGATTTAACTA CGTGTGTTAAATAGTCTGTATAGATATAAAGTC CCTCAGAGGAAGAGATTTGTTGAATAAATCAGAC ACTCAAGAGAA	164	D	—
IM000291	ATTAAACAGCCAGTGCACTCAGAAGTGAATGTTGA GAAGTGGGTAATCTGGGGACAAACAGAGGAAGAAT AGTGCCCTTGGCACGTGCAAAGGAGTTTGGGAACAA ACATG	165	K	<i>Fgf3/Fgf4</i>
IM000292	CATGTATGACAGTGAGGTGAGAGTGCCAGGGAGC TTGCATTGGCAGAACAGCCTTCTGGCCAAGCCTA GTGTCATCAAGTATATATTGGACCAGACCTTATAAA ACTTGGGTTCCACTCTGGCTGGACCAGCCTCAAGGC GTCGCCTCTCCAGGCCTACCTCCAGACGCAGAGGC AGCATTGAGGAGATTGAA	166	D	—

IM000293	CATGGGAACCTGTTCCAAGCAAGGGACTCTGCTACA CCTTCAAGGGACGCTGCTAATACTGGGTTCAACCTT GGGCAGCGTGACAGCAGGAGTGGGAGGGCTCTGAT GAGGAGAGCCACCCACACTGTGAGATCTAGGAGATA AGGTCACATCCAC	167	D	—
IM000294	CCCTCCAGCAAATTGAAATACGAAAGACTCAAACAC ATTAGAACCATTCCAATAAAACTTGCATTGCCCA GGCCCTCCACCACCATG	168	D	—
IM000295	CAAGAGTATATATCCAAGAAAAATACAGCTGAGTTG ACTGTTAGTTCTGTTTTGGCCTTCATG	169	D	—
IM000296	GGTAAAACTCTACCAGTTAACTACATT CCCAGCCTGCCTCCAATGAATTTAATTTG TGTTTTTAGGGTTTCTGTTATTGTTGTTT TTGAGACAGGGATTACAAAGATCTGCCT GCCTCTGCTTCCTGAGTGCTAAAAATAAA GGTATGCATG	170	R	—
IM000297	GTTTAGTAACTGTTTTCTGTATTACTTTTGTGAAA ATTAGATTGTTCTCGGTGACTTTGTGTGCTATATTC TCTGCATG	171	D	—
IM000298	CATGTTTCTGCTTCTACTTTATCCACCCTGCACACA CTGACTGCTATGTTCTGTACCTTTTCCATCTCTCC ATTGAATATTCACCTCAACAGTGGCATTGGAAATTG CAGTGGAGATACC	172	D	—
IM000299	ACGATGGTCTTGCCCTTTCTCACACCATCAATAGTC ACTCAGAGCTGTGGTTGTTATCTGAAGTGTGTTGCA GTCCAACCTTGCCCCATG	173	D	—
IM000300	GGAGTGTAAGCGTCGGTGTGTACCCGTGAGATTAA GTCAAAGTGACATG	174	K	<i>Wnt1</i>
IM000301	TAGACCCAGTCTTGCACTGGCCTGGGACT CGCTTATTAGGTTTGACTGTTATCTGGCC AACAAACACCAGGAAATGGGGTGACAGGT GGTTGTGAGCCCTCTGAAATGGGCATTGG GACCTGAACCTGGGTCTCTGTAAGAGAC ATG	175	D	—
IM000302	TCACCCAGCTGGGGCTGTGCTGAAGACTCTGAAGG GGAAGATAGCCTATGGTNACATG	176	K	<i>Fgf3/Fgf4</i>
IM000303	GTTGGGCTGAGCCACAAGTACACCTCCACTCACTGA GCCATCTAGCAGGTCCCAAACAAGGTGACTTTTGTC ATCCAGCAAGACATAGCCATCTATGCCAGTCATCCT TGTCATG	177	K	<i>Fgf3/Fgf4</i>
IM000304	TAACATATTTGCTTGTTATGAAGGAAAATGTTGGAT GTGTGTGCCTGTGGTTGAGTACTGCAAGTAGTGTCA GGGAAGAGAAACCTAGCTTGAACAGTCCCCCTCATCT CCTTCATATCCTCACTCCTGTGTCAGGCCCTGTATTA GGTAGTGCCTCCCTACCTCCCTAATGCTGTGACCCT TTCTTTAATAGAGTTCCTCATG	178	C	—

IM000305	CATGTGAGCACAGGTACCTATGGAAACCA AAAGTGTAGGATCCCTTAGAACTGGAATT ATAGGCAGCTGTACGCTATTGATGTGGGT GCTGGAACTGAACTCCAGGCTTCTTGAA GAGCATCAACTGCTCTTAGCTGG	179	D	—
IM000306	CATGTAGAGACTGCCATATCCAGGGATCCACCCCAT AATCAGCATCCAAACGCTGACACCATTGCATACACT AGCAAGATTTTATTGAAAGGACCCAGATGTAGCTGT CTCTTGAGACTATGCCGGGGCCTAGCAAACACAG AAGTGGATGCTCACAGTCAGCAAATGGATGGATCAT AGGGCTCCCAATGGAGGAGCTAGAGAAAGTAGCCAA GGAGCTAAAGGGATCTGCAACCTATAGGTGAAACA A	180	R	—
IM000307	CATGTCCTAGAGTTGTTCCAGCACAGAAGCTTTTGG GAGAGACCACCATTACTGAAACGAGCAGATGCTGC AGCT	181	D	—
IM000308	CTGCTTGTTGTGGGGACCAGCCAGACACCCTCCACA GGTGCACTGGTGCAACATG	182	K	<i>Fgf3/Fgf4</i>
IM000309	CATGATGTTTGTGCAGGAATAGAAACCTGACTAAG ACAGAGGATATTCAAGATCCAACTAGCAGGTTAGC TGTGGTTCC	183	R	—
IM000310	CATGAAGCACACATTACCCTGTGACTTGCTTTTTTA TTAAT	184	D	—
IM000311	CATGTGTCCTCTTGTCTTGTAGTCTCTATTCTTTGT GATTCCGAGCTCTCCATAGAGTGCAGTTCTATGTC CTGCCTGCAAGGTCCATTGGCTTACTAGGGTCTGCC CCTCCAGAAGAGTAGCTCATTTAGAATGCATTACT GGTGTGCTGTCTTGCACTCTTTTACCCT	185	D	—
IM000312	ATCTATGTTTATGCACTACTAATTACTGTTAGTTT ATATATGCCCTAATAATTACCCATTGAAACTTAA ATTTTGTTCAAAAGTGTGGTCTCATTGGAGGTGTT AATGTACAATGTCTTTCTCATG	186	D	—
IM000313	CATGGCCAGCTGAGCGGGCTGGAACCTGCCCTTCTG CTTCCTGTCCCTGCACCTCAGCACCGCTGTGCACTT GGTACTAGACCTCAATCACCGCAG	187	D	—
IM000314	CATGTGCGTCCCCCACAACGCAAGCGCACACCC ACAAAGAGAAGAGACAGGG	188	D	—
IM000315	CATGGCCACTTGGAGAGAAGGGGAAGGGAATGCGG AGAGAGCGGGAGCAAGAG	189	C	—
IM000316	CTTAAGCACTGATCAATGGCCAAGGTTTGCCGACTT GGGATCTGGGGTATAGACATCCACCACTGAGACCC TCTAACAAAACAGATGTGGAGGTACGAAGCCTGGC TCAGGGCCTGTCTTTGTATCAGAATTACCAGC TGCAGCTCCTGGGTGAGCTTTGTTTGGCATG	190	K	<i>Fgf3/Fgf4</i>
IM000317	GTGTATTGATATGCAAATGTGTTAAATATGATTTA AAATCCCCATG	191	D	—

IM000318	GCAAAGTGTCACACTTTGGTCTTCGTTCTTCTTGA GTTTCATG	192	R	—
IM000319	ATAGCAGGTCCTGGATACCCCAACATACCAGAAAAG CAAGATTCAGATCTAAAATCACTTCTCATG	193	C	—
IM000320	CATGTCCTGGCTTTGTAAAGGGTCCTGCTGGGTTTA CTTCACTGGGTCTTAAACTCCGATTGTGAGCCGTAG TGAAGAGGGCTGTATATAGTGGGTCACCGAGGTCCT GTAGCAGAGTGGGCAAGCTCACTGCCTGCTACCAGC AGTTCACTATGTTTTATGGTCTGCTGCCTGCTGGTG GTTTATAGATGCTGTGTGTAAGAGAAAAGTTCAGG GTAGCCTGGAGTGAATGGAGTTGGGGTATCAGGGAG GTCTTTGTACACTGGGGTGAGCTAGGCCTCTGGAAA GCTTCTGGGGTTCCCC	194	D	—
IM000321	CATGCTCCAGGCACCAGGCTTGCTTTGCATAGGTG GGACAGGGTCCCAATACTCAGCCTGGGGTGCCAATG AGGCTCAGGCCACACACCCTCTTGGTAGGAGTCACT GTAGTGGGGTCTGTGAGAGCCAGTAACTTGTGAGGG TGTGAACTTAGCTCAGGACAGAGGCCAGCAGGAAGC TTTCCCTACAGAGAGTGTTCGTCTTTTCCTTTT CTGGTTTGTTCCTTGGGAAGGGAACAATTTTCGCTT TAGTTGGCTTGTATTATTTCGCTACTGAAACCTTAA G	195	D	—
IM000322	CATGTATTAAGTCCCTCGTGAGGAAGGGT	196	D	—
IM000323	CATGAGTCAGAGGCTTCTACTCCAGTTAAAAGTAT CTGGGTATAGAATTGTGTTCTCAAGAAATAGTAAGT TATAATCAACTAAGTCATCTCCTGTCTCATTTTTTT CTTCCAAATCGGGTCCTCGAATTGTTATAAGAAGAT TCAATCAATCAACAGTATCCCTTTCCCAATTTGTGT GCTAAGTGGAACAGGCTTAGCACATCAATCACAT AAAGTTCATTAAGAAGGAATTTAAAGATCAG	197	D	—
IM000324	GCTATGAGTCTCCACTTGTAACAATTAT ACTCAAACATATTCAGGACACACTTGGGC TTCCTCCATCAAGCCAGGCAGGTTTGT TCTTGTTTGTGTTTGTAGATAGATGGATGGG CCAGCTTCATG	198	C	—
IM000325	CCCACCCCTAGCAACCAGTTCCTCCTCTGAATGGAA GACATCTGATACCAACTTTGAGCTTTCACATG	199	D	—
IM000326	ATCNNCGAATCATTCTAGGCTTGTGGGAC CATG	200	D	—
IM000327	ACTATTCTCAACAATAAATGAACTTCTGGGGGAATC ACCAATCCTGATTTCAAACGGTACTGTAGAGCAATC ATG	201	R	—
IM000328	CCTAGGCACCCACCACAATAGTTAATCCATCTTTGA ATTTTTGACCCAGTGTGCAAGTATTCATTGCAAC AGCTTTTCAAATGTTTTATTCTTCCCAAATAAATT CCATG	202	D	—

IM000329	AGAGGCTACCCCTTCAAGTGGCTTGCTAGTATAGC TATTACAGACAGAGAACTTCCAGTAATTTCTCAAG CCACATG	203	D	—
IM000330	ACTCTGAACCTTGGCTTGGCTGGTATTTTGCCTCT CTTATCCATTGACCCTGTACAGAAAAGCTGAGGAA GCAGGTGCAACCAGGCATCTCAGGCACCCAGTTAAG AAGTAGATGAAATACTGTAATGTACATG	204	D	—
IM000331	CATGATTTTCAGTTTTCTTGCCATATTCACGTCCT ACAGTGGACATTTCTAAATTTCCACCTTTTTCAGT TTTCTCGCCATATTTACGTCCTAAAGTGTGT	205	R	—
IM000332	CATGAGACAGTCCAGATCCCTCACCATAAAGAGCT ACCATATAC	206	D	—
IM000333	CATGCGACCATCCATCAGGAGTTGGAGGTGCCATCG GCTCTGCCCTTACAGAAAAGGAATCTGAGATTAGAA ACCCAGGTGACCCACTCAGGGCCACCGGGGCAGTA AAAAGAATCTAAGATCTAAAGTCAGTGGAACCTCT CCCAACCAGCAGAGACTCCTCCAGCCAGCTCTTGA T	207	K	<i>Fgf3/Fgf4</i>
IM000334	GGGAAGCAAGAGGCAGTAAGAAAGGGGAAACTGGGG AGGTAACCAAAGTCACATG	208	D	—
IM000335	CATGCTAACAAAGAAATGGGGAAAGCTCTCTAGGCTT CCACCTTAAACAATGAGGAAGGGAAGAAGGAAAG	209	D	—
IM000336	CATGTTGGTGGGACTTTATGGGTATTGCTTCTGATA TTACTAGGAGGCACAATCTCACAGAAAACCTCCTGA TCTTACAATCCTTCTGCCCCCTCTTTTGCAATGTTT CCTGAGCCTCAAGTATGGAGTTATTTATAGCTGTA TTCATTGAGACCAGAATCCACAGGTATGC	210	R	—
IM000337	CTCACACAGATATGCATG	211	D	—
IM000338	AGAAGTGATCTTTCTTCTGTGTCCCTGTACCCTT GGGAGGCAATCAGACGGTCCCTCATG	212	D	—
IM000339	CTTTCCTTTTGTGTTTGGACGAATATTATTGAAATAT GTAGTGTGCATG	213	D	—
IM000340	CATGAGATATGATTTTAGATCTGAATCTTGCTTTTC AGGTGTCTTGGCATATTCAGAACTCGCTGTGGTGGG TGAAGTGGGTTCTGATGATGCCATTGGTGTGGTT TC	214	B	AI597062
IM000341	CATGGAAAGGTATTTGGAAATAGGCTGTTTGTGTG TAACTC	215	D	—
IM000342	CCCTAGGACTCACCTGGTAGGAAAGAAGTAATCTT CCAAGTTGTCCCCTGACATCCACAAGCACATAGTGT CAGGCATG	216	D	—
IM000343	CATGCCATTACATACATACTGGCAATGGATATATAGA AAATGAGACTCCTTCTAATATTGTGTGATGACAGAT	217	D	—
IM000344	AGAAACCATTTACACTGCCAGGTTTGGGGCCTGCCT ATGCATG	218	D	—

IM000345	GATCCCTTTAACTTCTTGATAGTTTCTCTAGCTCC TCCATTGGGGGCCCTGTGATCCATCCAATAGCTGAC TGTGAGCATCCACTTATGTGTTTGCTAGGCCCTGGC ATAGTCTCATAAGAGACAGCTATATCAGGGTCCTTT CAGCAAACCTCTTGCTAGTGAATGCAATGGTGCATC ATTTGGAGGCTGATTATGGGATGGATCCCTGGATAT GGCAGTCTCTAGATGGTCCATCCTTTGTCTCAGCT CCAACTTTGTCTCTGTAACCTCCTTCCATG	219	R	—
IM000346	AGGGTGGTCTCTGCAACCCAGGCTGGAACCCAGCAC AATAAATAGTTTTATTACATAACCGAACGCGTGGC TCTGCGGCCACATTTGGGTCAAATTATTTACACAG TGATGAGGAGGCAGGACAGGAAGGGGTGGGAGGAGG CTGAGGGAGGCATG	220	K	<i>Wnt1</i>
IM000347	CATGTGTGTTCTTTTGTGATTGGGTACCTCACTCA GGATGATATTTTCT	221	R	—
IM000348	CATGAGGCCAAGGGAGAGGCAAATTCCTGTGTGAAT CAATTATCATCTCACAGAGAACATAACC	222	D	—
IM000349	AGTAGTATGCCACAGGGAGAAAGGGTATTTATCAAA GGGACAGGAGCTAGTTGTGGTGACCTTACCTATCTG CTTGCTCTGCCTCCACGGTGTGGGATTGAAGGTG TGCACCACCACCCAGCTTCAGATTTTGTTTTAA TTTATTGNGTATTCTGTTTCACCTGCATG	223	R	—
IM000350	CATGCATATACAGGATATAACCTTTGTAAGTAAGAA TAAAGCACATAAAAAATACTTTCAGTAATATTGTCC AAACCACTT	224	D	—
IM000351	CATGTGTGTGTTTGTGTTTGGGAGTGTGGGGCGG CAGGGAAGGTGGCCAGGCTGTCACTCAGAGATCAG GATGACAGGCGCTCCCTCATCTAGGCGCGGAGCTC TGATTGCAGATTCGAGGAAACAAATAGCAATTG	225	K	<i>Fgf8</i>
IM000352	CATGAAGATGAACCGGCTTGTCTCTGGCAACTA GGCTCAGAAAGGATAGGTCCACCAGCCGAGTAGCTG TCAGATGGAGCTGAAGACCTGAGGAAAGAATGCTT GTGGGAAGA	226	K	<i>Wnt1</i>
IM000353	TCAGTTCCAAGAGATGACACAGCCGCAGT CATG	227	R	—
IM000354	CAGAGACTGAAGGAAAGACCATCCAGTGACTGGCCC AACTTGGGATCCATCCCATTGAAAGCATCAAATCC AGACACTATTACTGATACCATG	228	R	—
IM000355	CCCTACAGTGACACTTACTCCAATAAGGCCACACAT CCTAGTAGTGCCAGTCCCCATG	229	R	—
IM000356	GGCCTCTATTCTCGGTTTCTAGATTAACTGCTGCTT CACTGAGAGCGGCTCTTTCATTCTAAATGGTTCT CATG	230	D	—
IM000357	AGTAGATGGCAGAGAATAATCAAACCTCAGGGCTGAA ATTAACCATG	231	R	—

IM000358	CCAACCCAAACAGCTGGGAAGGGTTGGAAGTAGCCCC GAGGCTGGTTAGTCCCCTTCCAGATGGGGAGGTTAG ACTGGGGCTAGCCAGGCTGCTCCACATAGACTTCCG ATTTCGATTAGAAATGAAAAGAGGAGAGGAAAGGGA AAAGGAAGAAAGGCTACAAGCATG	232	C	-
IM000359	CATGGGGTCTGGAGCCAGCTATCAAACCCAGGATTG TCTTAAGTGTGGTGGCTTGGATGAGAATGGCCGCCA TAGGCGCATAGATTGAATTCTTGGTCCCTAGTT	233	R	-
IM000360	ACGGTGGGCTGATATTTTCTAGATCTCCTAGTGCCT ATCCCTATTATCATG	234	C	-
IM000361	CATGAATTTTGAGATATTCTCTGAACCAA ACAATATT	235	D	-
IM000362	GGAGAAATTATGCCTTAAATTAAGCAAAATATTG AAAAATTAAATATAATTTCCATTAAATCATAATGGA CCAACAACAGAACACATCTATCTATGTATCTATCTA TGATCTATGTATTTATCTACCTATCTATCTGAAAA GCAAAACTACATG	236	D	-
IM000363	GCAAGGACAAGTACAGTTTGAAGCAACTATTTTCA TCTTGACTCTCACTCGGCTTTAACGTCCATTCAGG AACAGGCATG	237	D	-
IM000364	CATGAGAAGTCACAATCCACCACTTAAA ATCAGTGCTTGAAGGATACTGTAGGCCA AGAGGTAAGTAGAGGGGACAGCAGTGCAC GTTTTTCAAAGTGTGGGTGTGTGTTGTG GGTGTGTGTCTGTCTGCCTGTGCGTGTAT GTGGGTCAGTACAGGAAAAAGC	238	D	-
IM000365	CAAGATAAACTCTTAATGGGATTCTAGGGAGTCATT CTGTAGAGAGCACTTGACTAGAAGGTTAAGTCTTAG ATCCAGATCCCAGCACAAACATAATACATCCTATAC TCACACACACACACACACACACACGCGAGTCCT CATG	239	D	-
IM000366	CATGTCTCAAAAAAAAAAAGAATCACTTGGATTGT ACATAGTAGTTAATAATATGAATTAGTCTAACTGT GAAGGGCACTTATTAGTTTCTACTATGTAGTGTA ATGAAGTATGTTGCTATTAGAAATTC	240	D	-
IM000367	GAAGGTGAAATCTGTAATCTATCTTCTATGGCATC ATTCACCTCTCTAATACAGCTGTAGAGAAAAATGTC TGAAGATTCGGTCTACTCTCGTTCTTTGAGGTCTC CCAACCCATG	241	D	-
IM000368	CATGGCTGGACTATAGAGCTCTAGCTTCAGTTGCTG GGATGTTCAAGTGCATCACCACAGAGGGTTCTTAA GTGGTGATGGTGGTAGTGAAAGGTGGACCCCTCCAG ACAAAGGAAGCACTCACCACGACCTGCTCACCTGT GAACCTTTCCTTTCAGACTGATTCTGAGATCAGCC AGGCAGGGCTACCAACCAGGACTCGTAATGAAAT TTAGGCATATGG	242	D	-

IM000369	CATGGTCTGGTGAGTATGGCACCAGATAGGATGTTA TGCCCGTTTCTTATCTCAAGAAACAAGGAATCTTGT TTCTTATCATTAAATAGGAAGAATAGAGCAGTCCTGG CTAAATGAAAGGTGGNAAAGTTGGTTTGAGTATCTC TTTCC	243	D	—
IM000370	AAAATCCAATACACATTTCATG	244	D	—
IM000371	CCCTTTGTGTGCATTTAGCTAATCTCATCCCTGT TTGGGTCCTGGAACCTCTTGCTTCCCTGGCATCTA GGACTTGCTAGTGGCTACCCCGAGCTCCCCATTCCC CATTGCTACACACCTCTGTTCAAATTCCTGACCCTC TGTATATCATCCAGTCTCTTCTAATACCTGACCTG AACCCCTTTTCCCTCCCTCTATTCTTCTCCTTG CAAGTCCCTCCACCTTCTACCTTCCATG	245	R	—
IM000372	CATGGGTCATTTCTGATCTTTACCAAGCAACAGTGA TGAATCTATAAATAGAACCATCAGTTCAAGAAACAC AACTTTAGATTCCCTTCCATACCTTGCTTTGTTTC TTACATCTTCCCCCTGCCCTGTGGTTTTCTTTTAA TCTTGTTTTTACAATCCAAATTGTATCCCCTTCTCT GTC	246	D	—
IM000373	TTGGGCCTTTGCATACCCTGTCTGGCTAAGACAAT TGTCACCTGACTGGGCATG	247	D	—
IM000374	AAGTGGATGTTTCTCATTTTCCATG	248	R	—
IM000375	TATAAGCAATCCCAAAATTTACCTGGGAATCCT AGAGCTGATAACACCTTCAGTGAGCCAAGTATCTGG GTATAGGATTAATTTAAAAAATAGAAAATCAGTA TCTCTTTACATACAAATAACAAAAGGGCTGAAAAA GAAATTAAGGAAATAAACCCCTTCACAATAGCCATA AATAATATAAACTATCTTGGGATAACTCTAACCAGG CAAGCAAAAGACCTGTATGATCAAATCTTTGAAGAA GAAAATTGAAAAGGTATCAGAGGAGGTAAAGATCT CCCATG	249	R	—
IM000376	CATGGGCTCTGCTTAAGAAACCCGGAG	250	C	—
IM000377	CATGCTTTTAGGCCTTTTCAGATCTTANNGGGAC CGNGAGAGNTNGCTGCTGGATGATCTCTGAGAGAGC TTATCGTCCTCAAACCTGCTGATATTCAAGCTGTTTC GCAGCTGCAGCAGCAAAGTCCCGTCTTTGTACCCG ATCTGTGAACAGCAACAATGAGCACCTTTCATAACA GACAGGAAATGGATGCT	251	A	mDa1
IM000378	GGCGTACCTGTGTATATGCATGCATG	252	D	—

IM000379	GTGCTAGGCTCACTCAAGATAAAATTTGC TATTTTCAGCTCCCTGGATAATAAAATCTA TCCTCTCACAGCTGTGACTCTCACAGGGG TGCAGGCAGGACGACATCAAGAGAGTGAT GGCCTCTAACAAGTGTTCTGCCCACTTCC TCTTCCGGGTCAAAGACTAGATCTAGACT GGTGGGGCTGTTGATTCACTATGAATGTG CCTGACACCATCCCACACTTAGCATCATA GACACTTGGGGGACTGGTGATACACTATG ATGCCTGACACCATCCCACACTTAACATC ATG	253	D	—
IM000380	CTATCCCAGGGTGAGGGCAGTTCTATGC CAAGGTTCTCATCACAGAGATACAGAGGA AGCTGGGCCTGTCTTAGGGTTGGCTGTCT GGAGATCCTGGAGCCCTGGAGGTGGGTAG CAAGAACAAAGGAAGTACTTCACCTGATA AAAACAGTTCACAGAGAAACACATATACG CTTCATATACAGGAGTCCGAGTGTGTGTG TGCGCGCAGAGAGGCAGAGGCCTGGAAGT CAAAAGTTCAGGGCCAGTTTGTGTGCATG	254	K	<i>Fgf3/Fgf4</i>
IM000381	GGGGTTGACTAGAAGAAGGAGCGATTAGGGTGAT CATATGAGAGAAGAATAAATAAAGGAAAAATAAAT TTACAAGGATTAATAAGTAATTACATACATACATAC ATACATACATCCATACATACATACATACAAGTTAAA CTGTTATGGTAGCATG	255	D	—
IM000382	AGGATGATATTTTCTAGTTCCATCCATTTGCCTAAG AATTTCTTGAATTCATTGCTTTTAATAGCTGAGTAG TACTCCATTTTGTAAAGTATACCATATTGTCTGTATC CATTCTCTGTTGAAGGACATCTGGGTTCTTCCAG CTTCTGGCTATTATAAATGAAGTTGCTATGAACATA GTGAAGCATG	256	R	—
IM000383	CATGCCTGCAGGTCACAGCCTTGCGCGCCTCCAGTG CCCAGCGTTCAAAGTGACACAGACTCTGTCAGGATG GTTCAAATGCAAATCTCTGCAACTGCGTTAGCCGCT TCTAACCAAGACAGAAAGCTGCCGTCCTGTCTTCTG TGTCTGTCCCCATACCCATATCGGGTAGCTTTTCT TTCAGCATTGTCCAGACACCATCATATGCCTACATC GCACAAGTTCTCTGAGGCCAGATAATTGGCAGCACT CCTGTTGTGTGCCGAGAGTGCAGAAAAGGGCTATCC CGAAAAGGTGTGATCTGGAAGAAGGAAAAAAC	257	D	—
IM000384	ATCTTTGGCCAGAGCAAGCAGGGACTGAGTGAGCA GAGGTGACAGGAGCGAGCAAGGCTGACAAAGTCTTC CATATTCTACTAGGATGACCCATTAAGCCCCATTT AAAGCATTCCATTGCTTTCAAATACAAAGTCCCAA AATCCACATTCTTTCAAATAAAAGCATG	258	C	—

IM000385	TTAACATATGGTTTTTAAAAATCCATAATGAGCATA TGATAGAGAAGTCATCAGAGCTCTTCAGCTCCACAT CATCTGTCCCCAGAAGTATTACTACTCCTAACTTGC TGAGCCAAGGCACAGATATTCTTTGTGTAAGCATCT CTTCTTTATCCTGTGTGGCCAGCAGGAGCACGCAC ACTGCTTCCTGTCTGAGGTGTTCCATATCAGCATG	259	D	—
IM000386	CATGCCAGGGCTTGAATTAACACAAGTGCCCCAGAT	260	D	—
IM000387	CCTGTCTGTATATGCACATG	261	D	—
IM000388	CATGGAAATGAGAAACATCCACTTGACGACTTGAA GAATGACGAAATCACTGGAAATCGTGAAAAATGAGA AATGCACACTGTAGGACCTGGAATATGGCGAGAAAA CTGAAATCACGGAATGAGAAATACACACTTTAG TACGTGAAATATGGCGAGGAAACTGAAAAAGGTGG	262	R	—
IM000389	CATGAAGGTAAATTATGACCATCAGGGTTCAGACCT CAGCTCGACCGAGACCAGCCTGCAANTCCCCACAG CCCTCCCTAAAGTGGGTAAAGACAGAAAAGAATT AAATATCTGA	263	R	—
IM000390	CATGCACTAGCAAGATTTTGTGAAAGGACCCAGAT	264	R	—
IM000391	GACACATACACACATG	265	D	—
IM000392	GTAAATGTATTAGGTTCAGAACTGGCACTGCTCACT TATGTTACAGTTGTTGGGTAAACTAGAACCAAA CACAAAAGCAAAAGAGCCAAGCAGCAGAGCAGGGAG CAAGGGGCTTGGGGAACACTCACCTCTGTGTGT CTTCTTCTAGCTGTGAGGCATTGAGTGGCAAGGAG TGGAAAGGAACTTTGGGCATTCCGAGTCAGGAAAAG TGTACCAAAATAACACTATGGAGGTAGCAAGTGTT CTAGAGGGCAGAATAAATACATG	266	D	—
IM000393	GTTTAGGTCATTGGTGGTACACTCTCCAAGGACAGT ATAAATTGATTTTTTCTGTATCCTTCTTTGTCTT GGCCATAAGGCACCTGGAGTGCATTAATATGTA ATTATTACTATGTCTTTCTGTCTTTGGCTTAAAA GAAACAGGGTCAAGTGACCATG	267	C	—
IM000394	AGTTTTCTTTAAAAAATAAAGTAGGAATGAACTG GAACAAAAATGCAATAAATTTAAACCATCACCGCT AAAACATG	268	D	—
IM000395	CATGATTTTCAGTTTTCTTGCCATATTCAC	269	R	—
IM000396	GAGAGGAGCCTGGGGAAATGAAGGTCCAG CAACAGGCCCAAAGTGGGATCCAGCTTAA GGGAGGCCCAAGGCCTGACACTATTAC TGAGGCTATGGAGCACTCATAAAAAATGGA CCCAGCATG	270	R	—
IM000397	CATGGCAGCCTTGGAGTATCAGGCTGCTG TTCCCAATGTGGGATGCAGAGGGCACTGC CAGCCTGGTTATCACGCACCACTGTGACA CAGGGAAGCGCCCCCTTCCC	271	D	—

IM000398	GGAGTTCTTCTCTCAATAACAGAGTAAATTCTCCC TCAGCAGTTCTCCCAGGAAACCCATAACCTAGCCAT G	272	D	—
IM000399	CCTTAGATGTTTGTCTAATCGACAAAATACTTTATA TGTGAAAAGGAAAGCATG	273	D	—
IM000400	AATAATCAGATTTCCAGAGCTCCCAGGAA CTAAACCAACAACCAACGAATACACATG	274	R	—
IM000401	ATCCAGTAATCATTCACTTATTGTTTCCACACAGG AAAACCTGTAATAGATGGTTCATCAGCTTTATTTAT AACTTTCTATCTTGAAAGCAACTGGAATGCCCTTCA GTAGGTAAGCAGATACACTAGGCTCACCTCAACTAT AGGCACAATGAAAGGAATGAAATGTCAACTCAGGAA AGGTAAGTACACATG	275	D	—
IM000402	CCTCGCCATATTTACGTCCTAAAGTGTGTATTACT CATTTTCCGTGATTTTCAGTTTTCTCGCCATATTCC AGGTCCTTCAGTGTTCATTCTCATTTTTCAAGTTT TTTAGTGATTTCTGTCGTTTTTCAAGTCGTCAAGTGG ATGTTTCTCATTTTCCATG	276	R	—
IM000403	CATGCAAGAACAGGACAAATGTCTGTGAAGAAAATG AGTGAGCGTGAACAGGAGGTCAAGGATCCGGTCCCA GGCAGCTCTCAGTCTGGGCAAGCATTCTAAACTTT GCCTTCCTTCCTGTTGGGGGTGAAGGTCTG	277	K	<i>Fgf3/Fgf4</i>
IM000404	AATAGGAGTAGATGAGAATGAAGATTTTCAATTTA AAGGACCAGCAAATAGCTTCAGCAAATTATAGAAG AAAACCTCCCATACCTAAAGAAAGATGCCCATG	278	R	—
IM000405	CATGCAGCCCCATTAGTGATTGATCCTGTTCCATAT AA	279	D	—
IM000406	CATGGGCTCTCTGCTGATAATGCTGAGGC TGTTTGTGCTGTAGTCTGCGCTTTTTTGCC CCCTCTCAGAAAAAAGTGTATGTCATAGGA GTTGCTGGCTATTGGGTACATAAGCAAAG CCACCCTATTGTGCCAGTGCCTTAGACAG TGAGACAAGAAAGGCCCTGGTTAGAAAT CTTATCAGGACTGGGAATGTAACCTCAGTT GATAAGAGTGCTTGCTTAGCGTGCACACA GCCCTGGGTTC AACCGCCTAGTACTACAG AAACTGAGTGTGGCTTCACACACCTGTAA TCCCAGCACTTGGAGAGATAGATGCAGGA GGATTAGAAGTTCAAGGTTATCTTTAGTC ACATAGTATTGGTAGCCAGCCAGCCTGGA ATACTTGAGATACTTACAGGAAGGAAGGA AGGAAGGAAAGAAGGAGGGAGAGAGGACA GGAGGAAGGAGATAGATATACACAGAAAG AGACAGAGAAACAGAGATTCAGGAGACAC AAAGACATACGGAGACACAGTGAGA	280	R	—

IM000407	CATGTGGTTGCTGGGGATTGAACTCAGGACCTCTGG AAGAGCAGTCAATGCTCTTAACCGCTGAGCCATCTC TCCAGCTCCCTTTTAGACTTCTTAGTAGCAGCATT ATTCTTGCTTGGTTTCAGTTCTGACAACCACAGCAG TCAGGAGTTTGAGTAAGAGG	281	R	--
IM000408	CCTCATAATGTTTGTGTTGAGCATTTTTTT AAAACCTAACTTGTCTTTTGCTTATCTAT TGTGGTTTCTTAGTGTGTGTGTGTGTGTG TGTGTATGCGCGCGTGTGCTCTGGTCTTC GTGCACATG	282	D	--
IM000409	ATTGTGACATCTTAGGAGCTTAGGTTGGTCTTCGA GACACAGGGCTGTCCCTGTAAAGCAGGTTCCATCAG TGACTCCAGGGTTTAGCAGTTCAGTGGCGTAGTTT TCAGACTGCTTAAGATTTCTCAAGGGCTAGGCGTGG GGCAGAGACCCCTGCAGACCTGGCTAGAACAGANGC CCTGGGAGACAGTTGAGGGTGCTCAACTGTGGAGGA CATG	283	K	<i>Fgf3/Fgf4</i>
IM000410	CATGTATGCACAACCAAACTTATAAATATGAGAAT TCACTTATAGTCTTAGTCTTTAATACAGAATTTAG CATTCCGATATAAAACAACAGATTAACCCCAACAG TTAGAATAGAGCAG	284	D	--
IM000411	AATAGGAGTAGATGAGAATGAAGATTTCAACTTAA AGGGCCAGCAAATATCTTCAACAAATAATAGAAGA AAACTTCCCCAACCTAAAGAAAGAGATGCCCATG	285	R	--
IM000412	CATGCACACCCTACTCCTGGGTGATCGTACCAGCTC CAGCCTCTGTTCTGCAGCTGTGCCTTCAACCTGGC AACCTCC	286	K	<i>Wnt1</i>
IM000413	CATGAAAACCTGTCTCAGAAAAACAAACACGTTGA GAGCCAGCATAGAAGCCATAGGAGGTAATGTGTGTG TGCTGTATATATGACAAGAGCAGACCTGTGCTGAA CCAGTTAACTACTTTG	287	D	--
IM000414	CATGCTACTAACCAGTTGAGGCAGTACCAGTTGTTG AAGATGCTGTCTTTTATCCAATGGATGGTTTAGCT CCTTTGTCAAAGATCAGGTGATCATAGGGTGTGAGT TTATTCTGGGTCTTCAGTTATATTCCATTGATCTA CTGGCCTGTAATTGTACCAATAC	288	R	--
IM000415	GGTTAGGAATTCTGGACAGTTGGTACTGGTTTGAA TATAGTAGGTGACAAGCTGTGCCTTGAGTGGGGTGG CAAGCAGGGTTCTCTGCAGCAGGATGCAGTGTACAT G	289	C	--
IM000416	CATGAAAATGTTAAGTCTGACAGACAGGGTGCCAT CTGCCAAGAATTTGAGTAATCTAGAAACAGAAAT	290	D	--
IM000417	CATGGGGTTTGTGGATCTG	291	D	--

IM000418	CAGAACAATAAGCTGGAAGGATGAAGCAGCCACA ACATAACTGCTGTGGCTTCTTGTGTACATTTTAA ACCTTCCTCTGAAAGAGTGACCAATGCTTTTAACTG CTGAGTTATCTCACCCGACTTACTTTCTCTCTCTCT CTCTCTTTTCCTTCTTCTAAAATTAATTGTGTGTG TATGTGTGTGTGTGTATGATTGAGAAACCTTTTA TGTGGTGGTAGAAGACCATCTGCAGGATTCATG	292	D	—
IM000419	CATGGTCCCACAAGCCTAGAATGATTTCGT GGAT	293	D	—
IM000420	GGGGTCCAGGAGAGAACTTGAGTCATG	294	D	—
IM000421	GGAAAGAGATACTCAAGACCACTTTACCACCTTTC ATTTAGCCAGGACTGCTCTATTCTTCTATTACTGC TAAGAAACAAGATTCCTTGTTTCTTGAGATAAGAAA CGGCATAACATCCTATCTGGTGCCATACTACCAG ACCATG	295	D	—
IM000422	GTCCTTCCCAAAGAATAGTGTTAACTGAGCTCTTTC GGTGGCAATAAATGAATTGCTCTGGTGGGACAGGCA GTGCACATATGGGGAGGGGAGACACATG	296	D	—
IM000423	CATGTTCTTACTTCTTGTG	297	D	—
IM000424	GGGTATATGAATTATATATATATGTGTATATATG TATACAGGCATG	298	D	—
IM000425	CATGCGCCCTAAGACTCATCTCCACGAATGACGTGA CGACCTAATTGCATTTCCTTCTAACCACTGATTAGG CAAACCACTCCAAAGGGCTCGCTGAGTTCCTCTT CGGGAAGAGGTGTGTTGAGTACGCTGGAATGGATAT TCGAGGGCTGAGG	299	R	—
IM000426	CATCTCTCGAGCCCTTGCCAGCCTTTTTTCTTAAA ATTGTATTTTTTAAATTTATTTTCTGTACACAGGTG TGTGAGTGTGAACATG	300	D	—
IM000427	CATGTGGACCTGGGGCTAAGTCAGGGTGAAGCTTC CACAGCTAAGTGGCTGGAGGCTGCCCTAAAAGCTCA GGAGGCACCGCAAGCAAGCCTTGAAAAACCTTACCC ACCAGCTTGACCTTAGACTTCTGGCCTTCAGGCTGT GACAATACATTCTGCTGTTTAAAGAACCATATGGT TGGTGATGTTTGTGTTTCTGGTCTTTTGTGTT GGTGTGTTTGTGTTGCGGGGTGTGTGTGTGTGTG TGTGTGTGTGTGTGTGTGTGTCAGTGCTAGAG ATAAGATCTGA	301	K	<i>Fgf3/Fgf4</i>
IM000428	GTCTAAAGTTTCAAATGATGGATAAGTTGTAAAC CTCCTTTAAGATCTCAAGCACAAAAAGAAAGACATC AAATACGAATAGTAGAAAGGAAAGGAGATTGGAAC TAGAGGCCCCAAGAGTCATAAAGAGAAGAATTAAA CAACTGTACCCACAAATTCATTAGCATAGATCAAGT AGTCCATTTCTTCATG	302	C	—
IM000429	CATGTATGTTCTCGATGCCTTGGCCTG	303	D	—

IM000430	AAAGACATTAACTCTTGAGAACCAAGGGGTAGGACA GTATAGACTGAATTTTGCCTCCCCTCTTCATAAGTT GTCACGTCTAACCTCATTTCAGAACTTAAGCATATA ACCTTCATG	304	D	—
IM000431	CATGGAGAACTAGCAAGAGCAGGATGGCGTTTCTCT AGAATGCCGTATAG	305	D	—
IM000432	CATGGTGACTTTCCATCTTTAGAACCATATCANGT TTAAT	306	D	—
IM000433	CATGCTTATATCCCTCAAAAATTTTACAGTTAACT GAAAATGCTTACTTACTTTTTTTCTTACTTATATC TAGTATCGATAAGAACTGTCCCAAAGGACAC	307	D	—
IM000434	CTGGGTCTTAGTCCTCTGAGGTCCCTAGCACATCAG AGGTTTCATCAGTTCCAAGAGATGACACAGCCGCAGT CATG	308	K	<i>Fgf3/Fgf4</i>
IM000435	CATGGAGAATGCACAGTCAAAACGCTTGCATCCT	309	D	—
IM000436	CACCCCTCCCGCCTTACATCAATCCTGG GTGCACAATGGGACTGTGGATGACTGATG TCTGCGCAAACAACCTGCGGGGAAGTCTA GCTGACAAACGCTCATG	310	K	<i>Fgf3/Fgf4</i>
IM000437	ATGTATCCAATGGCAAAGCACGGGGAGGCTTCATC TTGAAGAGAAGAGTGTCTTGGTAGGCTATCCTTTT TTTGAGACAAC TAGAAATAGGAGCATTCAACAATC TGGACATATGTCTCCCAAGAAGTGTGAGAAT GGGTCTGAATTAAGTGAATAAAGTGAACACATT CTCCTATACACATG	311	D	—
IM000438	TCACCTCCATTTTAGTTCAAATGCTACAAC TCCTTTGAGCACCCTGTCAATTCAGAC CTTATTCTGTGAATACCATG	312	C	—
IM000439	CATGCTTAGCCAGGGAATGACACTATTCGAGGTGT GGCCTTATTGGAGCAGGTGTGGCCTTGTGGAAGAA GTGTGTCACTCACTGTGTTGGGTGGGATTGAGAGCT TCCTCCTAGCTGCTGAGGATGCCGGTCTT	313	R	—
IM000440	CATGAGCTGGGTGAACGACAGCAAAGGTTGTTTCT CTTTTAAGGAAGACAATGGTGTGAAATTGGTTGATC CTTTGGGGGAAATGTTGGCCCTT	314	B	Mm.2024 5
IM000441	CATGATCTCACTGTGAGGGCTGGCTACCTTGGAGCT CACTGTACTGAAATATTCTGGCCGATTGCCTCTTCG CTGGGTTTATGGGCACACAGTACTTGTCTATGAG TCTTTGTTAGGCTGAGCCTAGTGGTGCAGGCCTGTC ATCTCCCTACTTTACTTTAGGCTCTGAGGCAGGAG GAT	315	D	—
IM000442	TCTGGTAACTTGGGGGTCTGATAAAACAG TTGGGGGATTTCCTTTCTTTTCGCGTCTG AAGCCAATGTTATTACAGGTGTGTGCTTG TCTCTCCACACCCTGCCCTGTTGCCTA ACACACGCGGCACACACATG	316	D	—

IM000443	CATGACTCTTCCTCCAGAGTTAGAGGTGGAGCCAGG ACAAACTCTAAAGAAAAGAAACCCCAATCAAAAAGG GAAGCTGGTATCATCCAACCTTTAAATTACTCCACA TCCCTCCAGAG	317	D	—
IM000444	CATGTCTGTCCCAAAGGAAGTTCCTTCCTCTGTCC TCCACATCTGACCAGCACCATCATTCAATCTGCAAC CCAAACCAGACATTTACATCATCTATGCCTCCTTTC CTGCTTGTCTCCCCTCAACCAGCACCAGCAAGCTT TCAGGTATCCCCTTAGTGTGTGTCAGGATCTCTCCAG TTCTCCAGACCCCAATTCTGTTCTCACTCTACACTG CTAGC	318	D	—
IM000445	AAAGCTAACTTCTCATCACCTACCTAATAGCCTGAG AGCCCTGTGTAGAAAAATTAAGGAGTTTAGTTCCTT CATG	319	C	—
IM000446	CATGCAGACAAAGTAAATAAGAAAACAAATTAAATG TAGGCTGGACGGATAGATGGT	320	D	—
IM000447	CTCAGCTCCTAGGCAACACTTGTAGACCCACAGCCC CTTCACACACACACACACACACACACACACACAC ACACACGGCTGGGGATCCAACCCATCTCGTCTTAC ACGTGCTCTACCATCACACCACACATTTCCAGCACT TTATCTGAAGTGTTCCTTTTATTTGTGCATG	321	K	<i>Wnt1</i>
IM000448	CATAACCACTATAACCAGCCTGCTTACTTGGCTTTG TTTCGAGGGCTTTTGTTTTAGAGCTCTTCTTTTA CCCTTCTCCGTGTGTGTGTGTGTGTGTGTGTGTG TGTGTGTGTGTGTCTGTCTGTCTGTCTGTCTGTG TCTTAGTGTTTGTACATG	322	C	—
IM000449	CATGTGGTCCACGGTTTTACTTTACTAGGGAGCAAC CTGTACCACAGGGAGAGAGGCCTAAGGACAGGAAAG GAGCTGACCCAGAAGTGAAGGACACACACCATTTCT GCCAGCACTTCCC	323	C	—
IM000450	CATGTCCTACAGTGGACATTTCTAAATTTCCCTTCT TTTTCAGTTTTCTCGCCATATTTACGTCCTAAAG TGTGTATCTCTCATTTTCCGTTATTTTCAGGTATCT CGCCATATTCAGTTCCTACAGTGTGCATTTCTCAT TCTTCAGTTTTTTCAGTGATTTTCGTCAATTTATCAAG TCGTCAAGTGAATTTTTTTCATTTTCTCTGATTTTC AGTTTTCTCGCC	324	R	—
IM000451	CATGTTGCCTCAAGACAGATCTCCACTTTAAAGACA TACCTAAAGGCCTGGAAGCTTAGTCAATTAAGCTTT CCTGCCCAGACACTCCTCCCTGAAAAGGTATTTAA CCTCAGGCCACCCCTGAGAAGTGGGGTATGATTTTA CTCATCCACTTTC	325	R	—
IM000452	CATGGTTTCTATTACTGTGTTGAAGCACCTGACCA AAGCCAATTGGGGGACGAAAGGGTTTATTGGCTTA AACTTCCAAATCAGTGTATTCATTAAAGGAAGTCA GGGTAG	326	R	—
IM000453	GCAAGTGTGACACGGCTCTCAGGGAGATACACATAG CTTTATTGGATAACTGCAGCTTGAAGACATG	327	D	—

IM000454	CATGTACCTATGTGTGTGAACATTTCCTATTTTC ACACAGTTAAGAAAGCATCGTTATGAAAATCATTAC AACTTTCAGATAAACAGATCCACTCAGCCACAGAT	328	D	--
IM000455	GCCCTTCTCTCTGAACTTTTCAGTTCCTGGATAAAG TCAGTGTTCCACCTCTATACCTGACTAGTTTTCCTA AATTCTGAGTCAAGCATATTTTCATG	329	D	--
IM000456	GACCTCGTGGGCGGGCCTGAGGAGACAGTGCAGATG AGGTGTCAGTAAGGAGGATGCAAGCAAGAAAGATGC AGGAGATGATGGAGAAGCTGAAGAAGGCACTGAAGA AGGCACAGGAAGAAGAGTGCATG	330	D	--
IM000457	CTTGCCGTTGAGAGCGTCCAGATCCCCTGACTTGAG TGGGTCCACCTGTGTTGGTTTGGTTCGCAGTGTCCG CTGTGGAGCCCCAGGCCTTGCATG	331	C	--
IM000458	TTCTTATCCACTGAGCCACACTGCTAATACTGTGAT GTCTTTTTTAAGACTCACCATG	332	D	--
IM000459	GGGTCAACACATTTTGGAGATTGATCAAAATTAA AACATG	333	D	--
IM000460	CATGAAGGAGAGTCTGAGGCTACATCCACCAGGCTC TATGATCTCCCTCTGCTGCATCCAGGACATTCTCCT TCTGGATGAAGATGATGCTGGCGCTGGCGCTGGCGC TGACGCTGATGCTGCTCGCTTCTGCGTCTCT	334	C	--
IM000461	CCTTGTCCTCAAATTACAAAACCTCCCTAG GGTCTTTTCTCTGGGCTACAAAATCTGCTC AAATGGACTCAGGAGGAATCAATGTGGAA ATTTCACTTTGCCTTCCCAATCAGCAAAA TAATGTTTGCCAAAATCGTTAGATTTCTT TCCCCTAAGTAGGCTACTGCCGACTTGAA AGCAGTGGTTCCAGAACCCGAGCCCAGGG GCTGCCACTTCCTATGCATG	335	B	AI426908
IM000462	CCCTTGTCCTCAAATTACAAAACCTTCCTTA GGGTTTTTTTTTTTGGCTNCAAAAATTTTNC AAAGGGCTTCAGGAGGAATAATGGTGGGA AATTTACTTTTGCTTTCCAATCAACAAAA AAATGGTTGGCCAAATCGGTAGAATTCTT TCCCTAAATAAGCTACTGCCGACTTGAAA GCAGTGGGTTTCAGAACCCGACCCCAAGGGC TGCCCTTTCTATGCATG	336	D	--
IM000463	CATGTATCTTAAGAACAGAGCCAGTGCTCTCCCTCT CCCACTTGAT	337	D	--
IM000464	CATGCAGANTAAAGTACATATATGTAAAAAATAAAA ATAAATCTTT	338	D	--

IM000465	GTGCTCTCCCTTGCCCTCTCCTCTCCTGAG TTTCTCTGTAGGTGTAAGGGCTGGAGGTG GGCCCAAGAACCAGAGATCAGAGGAGGGA ACTTCCGGAGCAGAGGCCCTGGGAGCAGT GTTAAGCAGGCTTTGGCCAGGTCTGGAGG TGTCCAGGCAGGGAGGTGGAGCTGGAAGA GACCAATTAGTCAAACGGCTGCAATTGGC CATTTGGAAGCAATTAACAGGGTCTCCAT TACCATATTATGCCCCCTCACCCCCCTCCA CACTCTACTAGGCTCTGCTCTGTATGGAA GGGGGAAGGTGGAGGCTCANCTCAAGCCA GGGAGACTACAATGGAGGCCCAGTGCTCG CCAGGATGCACACACTCAGGCACCCTCCG TGTGAGGAGGGGAGGGCAGGGCAGCATCT GAAGCAACCTGTCATTACAGCCTGANAG ANGGTGGGAACAANGGCTTNCAAAGCCAA GAANGCANGTGGNTAGAAATGCANGAAAA CCTCTCTGGTAAGAAAGGCTGAANGAAGC AGCTAGGGTTGTAAACAAGANCAT	339	K	<i>Fgf3/Fgf4</i>
IM000466	CTCCCTCTCCCTCTAGCTGGCCTAGCAGGGCCAAT ACAACTGCAGGGAATCAAGGAAGAGCCTTTTCCTGA ACTGTCCTGGATGCCCCAGTCCAACAGCAACTCCCA CTTGCCCTGGCTTGGTTTGCTCCACTGTCCTGAAGG CACAGTGTGATATCCAGACCTCCAGCGAGACAGCC CAACCTGCAAGCCCTGATGGGAGGGGTGGCCTGAGA CAACAGTACCTACATG	340	B	AI550057
IM000467	CATGGACTCCAGGGTCAGGGTGTAAGAAAAAGGTGG AGCCTGCTAGGTGTGGTGACACACACCTTTAACCCC AGAACTCAGAAAGCTGAGGCAGGTGACTAGCCAGGA GTTCAAGGTCATCTAGTTCATCAGATCTATAGAGTG AAACAGCCAGGCTACATTTGAGATC	341	K	<i>Fgf3/Fgf4</i>
IM000468	GCTCAACACTTAAAGCGCCTGCAGAGGGGTGGGGG TTTAATTCCCAGCACACATAGTGGCTCAGGGAAT CTGAAGCCCTCTTCTGGCCACTGCGTGAACCTGCATG	342	D	—
IM000469	GTGGGAAGCTATACGAAAGTAAACACACTCTAAGA AAGAGAACAGGCTGCCTGGGAGAGGGAGGTGCCAGG GGCTTAGACAGGAAGGTAGTTTCAAAAAGTAAAA CTTAAGCTATCTGAATGAATGATACAAAATAAAGA AGACACAAGAATTTCCAGTCACCTGAGATATCTCAC ACTCCTGTCTTTCAACCTTCTAGCTGAAAGGAGAA AGAGCCATG	343	D	—
IM000470	CATGGAAGGAGTTACAGAGACAATGTTTGAGCTGA GACGAAAGGATGGACCATCTAGAGACTGCCATATCC AGGGATCCATCTTATAATCAGCCTCAAACCTGAC ACCATTGCATACACCAGCAAGATTTTGCTGAAAGGA CCCTGATATAGCTGTCTCTGTGAGGCTATGCTGGG GCCTAGCAAACACAGT	344	R	—

IM000471	CATGCTTAGATTGACCGCAATATGTGTGGTACTCTT CAGACTTTTAAAGATTGTCTGAATATCTATTCCCC TTAAATTGTGATCACCCTAGCTAGATCTAATCTTAG ATCTCGAAAGTTCTACAATTGCCTCAATTGATTA CTGTTTCTCCTTGAAGAC	345	D	—
IM000472	CTTGCCCTGGGAAGTGAGGGGTTCTAATGAAGGTTG CAAGCCTGTCCACCCAGGGCCCTGCTAAAGAAGGAA TGGTCCCAGCCTGTTTGTCCCTCTGTGGCTTCT TAGTTCTGGACACTGAGCCAGTCTGGGCAGCAGGCA ATTCACACTGTGAATTTCTGTGAAAGCATTTTGGG GGTTCTGAAAGCCCTGTACATTCTGTGTTAAGGACA GAGGGCCTCCTGCATG	346	K	<i>Fgf3/Fgf4</i>
IM000473	CATGGGGGCTATGTCCTAGGGTAGACACCCCTTTA TCCCTCACCTCCTTCCCTGTCTTAGCAGTGGTGTCC CCCACTGTGACTCTACTGCATCTGGGAGCTGTCTCC CGGGGACTTCTCCTGCTGGAGTGAGTAGGTGGCT AGGGCGAAGCCTGTGTAAGAGGCAGGAGGTGTTTG CACAACCTCAAAGGGTGCAGATCTGCTGGCTCCAG CTCCCAGGGCCAGACCCCAATACCTTCACCCA GC	347	K	<i>Fgf3/Fgf4</i>
IM000474	GTGTATGTTCTCTGGTGAAAGTGTAAACCAGCTCAC TCCGTGAAGAGCACGCTGCTTTCAGATCAGTGTTCA GAGTCTTGAATAATTGGTTTTTAGAATCATAAAATT GCAGTCTTTACAAAGGACTGGAAGTGAATCATG	348	D	—
IM000475	CATGTGAATTCTCTATTTGCAATGTGCTTGGTTCAT ACTTCCATACTCTACCCAGAGCCTGTTAGAAAAATC ACTCTTCCCCACCCTATTCTTCACCACTCAATATGT ATCTAGTATTCTAAACTTCTCCTCCTAAGGCAGT GGGAAG	349	D	—
IM000476	CATGTGTACTCTCACCATCAGAATTATGAGCAACCC ACAATTTCTTCACATTTATACTGACCCAGTCTGAG GTATTGTGCCTTTAGCAACAGAACTGAACTCAAAA CAATCGGCACAC	350	C	—
IM000477	CCATATCAGACCAACCTTCCACACAACAGTAGGCC ACCAGGTGGGGCAAAGTCTGGGTAAGGTTCTTGG CACTGTAATTTGAATCCCAATAATAATGACTGTGT TATTTGCTCATG	351	D	—
IM000478	TAAACCTTTAGGGAGCTGATAAAATCTATCAAAA CAACACTCTGTCTCTCGTATCCAGCCATCCATG	352	C	—
IM000479	TCTGCCAGCCTTTGCTTCTCCTCGGTAAACAGGAT GCTAATTAGAATTCATG	353	B	AA11778 4
IM000480	CATGTAAAAAAACTTCATTAACAACTA CAACAAAGCAGAGACCTTGGCCCTTGGAT TGGGGCCCCCTCTGAGAGCTATAGGCTGGG ATACTGG	354	D	—
IM000481	GTGCGTGATAACCAGGCTGGCAGTGCCCTCTGCATC CCACATTGGGAACAGCAGCCTGATACTCCAAGGCTG CCATG	355	D	—

IM000482	ATGTCAACATTGAGTCCAGTAAGGACATCGTATATG CTGGTCATTATTATAGCTCTAAGGGTTTCATACATGA GACAGACCACCCCTTACCCCTCCCCGTCTGGGC TAAAAGCAGACACACTGGGTGGTGAGAGAGCAGCA G	356	K	<i>Wnt1</i>
IM000483	CATGAGACAGACCACCCCTTACCCCTCCCCGTCT TGGGCTAAAAGCAGACACACTGGGTGGTGAGAGAG CAGCAG	357	K	<i>Wnt1</i>
IM000484	CATGAGAAAAATTGTCTCTAATTCTCTTTGTTGAA TTTTGTGTGGTTTGTATCAGGTGATTGTGGCCT CATACAATGAATGTGG	358	R	—
IM000485	CCAGTGAAGTAAACCCAGCAGGACCCTTTACAAAGC CAGGACATG	359	D	—
IM000486	TCGGGGGAAAGTTATTTTATACCTTCCCGCTCTGG ATTAAGGGAGGGTAGGAAAGGATTGGATGAAGCTAG AGACAGAGTGGCAGGAAGGTGGTAGACCTGAAATTG TCAGACAACCACTTATCGTTGGGAAGGGTATAAGGT GACCACAGCACTAGCAGACTGTTCTGGACGTAGTAA GGAGTTCCTGCAGGGGAGGAGTGGGTGAGCCTTTGA ATCCCATATGGTGGTTCACAAGTCAGCCTACATG	340	D	—
IM000487	CATGTGTTTTAGCAACTGTGCTCATTTTCTGCTGC TGCTAGGAATAAAATCAAATCTAGTANAATTGCTTT AATACAAAGTTATTGTCTCATCCATCTCTGAAGATCTG AAGTATTGCTGGGGGTCTCCAACCTACCCACC	341	D	—
IM000488	CAAGGGCCTCTCCTCCCACTGATGGTCGACCAGGCC ATCCTCTGCTACATATGCAGCTAGAGACACAGCTCT GGGGGGGGGTAAGTGGTTAGTTTCATATTGTTGTCCC TCCTATAGGGTTGCAGACCACTTTAGGTCCCTGGGT ACTTCTCTAGCTCCTTCATTAGGGGCCCTGTGTTTC CATCCAATAGATGACTGTGAGCTTCTTATAAGCATA AACTTCACTTACCACATG	342	R	—
IM000489	CATGGTGTTAGCCTCCAGGCAGGAAGCATACCAGAG GAGAACTCCACAGGAAGCCTTTGTTTCTGCTGTT AAAAACAAAGTATGATGGGGCTTAGAAGAGGCTTTA AGAGGTCCTCTGGAGAAAAGATCTATTTCCATT	343	D	—
IM000490	CATGAGAGGTTTTTAAGTCTGAAAGACCATCATAC CTAGAGTCTATACAACAAATAAACTTGAATACAGT GAAGCTAGTAAAAATAAATTCTGAGCTTATGG	344	D	—
IM000491	CACAGTCAGGAAGCAGAAAGATGAACGTTGACTCTC AGCTCTCCTTCTCCCTTTAGTTCTATGGAGGTCTCC AGCCCATG	345	K	<i>Fgf3/Fgf4</i>
IM000492	CATGATAAAAGTCTTGAAAGATCAAGAATTCAAGG CCCATAAATAAACATAGTACAAGCAATATACAGCAA ACACAGTAGCCAACATCAACTAAATAGAGAGAAAC TTGAAACAATCCCACTAAATCAGGGACTAGACAAA GTTGCCCACTCTCTTTAACTGTTCAATAGAGTAC TCAAAATCCTAGC	346	R	—

IM000493	CATGGTAGCTTTCTAGTGAGGTCTCTTCC	347	D	—
IM000494	AGTACCCTTAGCCAATAAACCATCCCTCTAGTCCCT GTTTGTGTTGTTTTTTTTTAAAGACAGGGTCTCAC CATG	348	K	<i>Fgf3/Fgf4</i>
IM000495	CATGAGCTAGGCCATCTGCAAGCTGGTCTCGTCTTG ACCAGGAGTACACAGAAGCCTGGCTCAGGACTTGGT AAC	349	D	—
IM000496	GTTGTTTATGCAGATCTCTCAGCGTTAGCATTCTAT GGGATTCTTTGGAAAGACCTTTTCAGTTATCTTCCA TTTCTGAGGCTGTTTCTAGGCAACGGAGTGGTACCT TCCTTTAATCTCCCTGACCTTTTCTGCCTATGAA GATGTTGACTAGTGAGCCCGTGGGATGTGTATTAT CTGTTACATTTATTATGGCTTGGTAGCGACTCCTT GGTTGTGTTTCAGCTTTTCATG	350	D	—
IM000497	CATGCCTCCCTCAGCCTCCTCCCACCCCT TCCTGTCCTGCCTCCTCATCACTGTGTAA ATAATTTGCACCGAAATGTGGCCGCAGAG CCACGCGTTCCGTTATGTAAATAAACTA TTTATTGTGCTGGGTTC	351	K	<i>Wnt1</i>
IM000498	TCTAAGTCCAGTCTTTCACACACTGACTTGGTC ATCTGTAATCACAACATG	352	D	—
IM000499	CATGCACACAACTGGCCCTGAACTTTGACTTCCA GGCCTCTGCCTCTCTGCGGCACACACACTCGCA CTCCTGTATATGAAGCGTATATGTGTTTCTCTGGGA ACTGTTTTATCAGGTGAAG	353	K	<i>Fgf3/Fgf4</i>
IM000500	GGGCTGAAGGAAAATGTTGTGTGCATCTTT TGTGGCATG	354	D	—
IM000501	CATGTACCACTTTTGCTAATCCCCTAACC GCCCCCTGGTAAGCATCTAAAGTGATATA TCTCTTGGTCTACTGAAGTTCTGCCCTGT CTCCATCGGGGATTCTCGGGAGGCTAAAA TTATAGACTATTTGTGAAAG	355	D	—
IM000502	CATGTCCTTATGATATGGAAAAA	356	D	—
IM000503	CATGTGCCAAGAGCCATTACAGGCTCAGA CTAACATCTGCCTGTAAACAACGGTTGCT AAGTTTCCAGGGAAGCGTAAG	357	D	—
IM000504	CCAGATGACCTTGAACCTCAGAGATCTCCTTGCCTTA GCCTCCTGGGATTCATAGCCGCTATGCCTCAAGATC TCCATG	358	R	—
IM000505	CATGTAGTTTGCAAACAAGACATCCCTGGTATATCC AGAACCTGAGCTATGC	359	D	—
IM000506	GGATATAGTGTCAAACAGTCTGATGTATTATAGGT TTGTATCCATAGTTATCAAATCTCTCATG	360	D	—

IM000507	CATGTACCACACAGACTTGGTAATAAGTTAGATG ATAATTACAAAAGCAACAAATAAAACCAACAAAACA AAACAAAGCTTGGTAATA	361	D	—
IM000508	GTTAGGAGCACGAAGCTGCTCTTTCAGAGGACCTGGG TTTAATTCCTCAACTCACATG	362	R	—
IM000509	CATGGTCAATGATAAACATTCCAAACACCAAACC ATCCTCTCTGTACAGGCTATGATGATTCAACTGCTG CCCTTCCTCATTTCTTGTTCCCACTCCTACTGAAT ATTTCTGTCAT	363	D	—
IM000510	CATGATAGAAGACCACGTCTGGGATGGGGTAAGGGT TTCTCAGAGTACCTTGCCCTGGGGCCACATCCTAAA TCTACAACAAAGCTGACCCTA	364	D	—
IM000511	CAAGTTTTTGTAAAGGAGCTAAGAAAGGCATGTGTG GTTAGGTTGGAAAGAGGGGGCAGGACCTGGCTCTCG CTTCAGCCCACTCCCTCTGCCCCCAGCCTCAAAC ACTTTTACCCTAGCATAGCAGAAACATG	365	D	—
IM000512	CATGAACTCAGTGGGCAGATGAAGAGTTTTTGTGTG AACTGGGGCTTTGCCCTTATCATCTGTGTGTTCTC CTGGTGACCCTCAAGCTTGGCTGCAATGATCCCCAC TTACAGAT	366	K	<i>Fgf3/Fgf4</i>
IM000513	GTTTATTACTCCAATGATTTCGCACAGCCGGGTGCA AGTCTAAGGCAGGCTGTCTGCCTTCTGGAGGTACT TACCCACCTCCCCCTCTGGGGAGCTCCACTGGC CATG	367	R	—
IM000514	CATGATTTTCAGTTTTCTTGCCATATTCACGTTCT ACAGTAGACATTTCTAAATTTTCCAATTTTTTCAGT TTTCTCGCCATATTTACGTCCTAAAGTGTGAATT TCTCATTTTCCGTGATTTTCAGTTTTCTCGCCATAT TCCAGGTC	368	R	—
IM000515	GTAACCACTCATTTACCTGCCCCAATGATGTCTGGG CCAAGGCACTTTTAAATTCATATCTACTGTGACTAT AGGTGCCCATG	369	D	—
IM000516	CATGACACTGCTCACTGTTGCTCTCTAACCTTGGTC CAG	370	D	—
IM000517	GNGCTTGGCAGAGTAGAGAACTCTTTGGGAAACTT GGTTCAGATCCAGACATG	371	C	—
IM000518	CACCTCTGCCTCAGTTTCCCTGATTATCA ACAAGTGCTCATG	372	D	—
IM000519	CATGTAACCAAGAAAGTCTAGTAGGCGTAGTGGTA AATGCCTTTGATCCCAGCACTTGGGAGGTAGAGGCA GGTGGGATCTCTACAAATTCAAGACTGGTCTGGTCT ATATAGTGAGTTCCAGGCCAACCTTCACATTGAAAT TCATCTCAAAACAATAAAATAGAGGAAGATATAGT CAGGCAC	373	R	—
IM000520	GAAGACATTCATTTTTTCTTGGGAGGGGATAGAAT CCAAGGCTCCAAAGCAGAGTTTCATG	374	D	—

IM000521	GACCACGCTGGCCTCGAACTCAGAAATCTGCCTGCC TCTGCCTCCCAAGTGTCTGGGATTAAAGGCTGTGCCA CCACTGTGCTTACTGATCTCTTTGATGTCCCAGTTA TAGCTCTTGGGTTCCCCACCCATTGTAGGGGGACC CAGGACACCTCAGAGCTCTCCAAGTCTAAAAAGGG CAGGGTTCTGGCTCCCTTAATGCCTTATCAAGCAC AACAGAACTCAGGGGCAGAAAATGTTCCAGGAAGA ACTTAGCTGTGGGAGAGTCATG	375	R	—
IM000522	CATTTTTCTTTATAGCTGAGTGTTATTCCACTGCAA AAATTTGAATATTCCACTATTCTGTGATGAATGTC TAGGCTGGTCACGTTCTCTGCCTTTGTGAATGGAG CAGCAATAAACATAAGTGGGCATG	376	D	—
IM000523	CTCCATTGGGCCGAGTGAAGCTGTGGTTCAGAGAAA CTCTATGGACAAGCTTGACTTCCAGAACATTGACCT GGTCTCTGAGATCAACAAGCGTAGGAAAGCCATG	377	D	—
IM000524	CATGGGAAAGTAATCCGTGGCTAACACAAAGGGGAA ATAAAGTAATATT	378	D	—
IM000525	CATGTAGGACCCTGAATGCCAGCAATGAACAATACC AGCTTGGTTTTCCGACTCTTGCTTTCTCCTCCCTCC ACTACTAAGTACCTCACCCTGTCATCTTGTGACTC AGAGGTCTTGTTCCAGGGCTTCCTTCCTCCAGTG TTCTTCTAATGCATCTAAAGTGAAGGGGTGG	379	D	—
IM000526	CATGCAAAGCCTCTGCAGGGCCGACAGCAAGGAAGG CCCTTCTAGATCTCCAGCACTCTGTCAAAGCCATC ACTCGGCAGGCAGGCAACCACAATGTAGGGAAGACC TGTAAGCCCTTCAGAGAGGAACAGCTGGCAGCCCCCT GGGTCACTCAGAGTGGCCAACAGCTACTCTTGTGGA GACAGCAGGAGGAGGCTAGACTATAGAAGGATGGA GGAC	380	D	—
IM000527	CATGCACACAACTGGCCCTGAACCTTTGACTTCCA GGCCTCTGCCTCTCTGCGCTCACACACACTCGCA CTCCTGTATATGAAGCGTATATGTGTTCTCTGGG	381	K	<i>Fgf3/Fgf4</i>
IM000528	CATGAAACATTATTTNTTTTGGAAGTCTG CAGGTAACTTAAATAGGTTAA	382	R	—
IM000529	AGCAAGAACAAGGAAGTACTTCACCTGATAAAAAC AGTTCCAGAGAAACATATACGCTTCATATACAG GAGTGCGAGTGTGTGTGTGAGCGCAGAGAGGCAGAG GCCTGGAAGTCAAAGTTCAGGGCCAGTTTGTGTGC ATG	383	K	<i>Fgf3/Fgf4</i>
IM000530	GATTTTATTTTCCTTAGCATCTGATTGGAGATGC CTGGGTGCACATG	384	K	<i>Fgf3/Fgf4</i>
IM000531	CATGTAGAGACTGCCATATCCAGGGATCCACCCCAT AATCAGCATCCAAACACTGACACCATTGCATACACT AGCAAGATTTTATTGAAAGGACGCAGATGTAG	385	R	—

IM000532	GACCTGTACCCTACCCTCTGATGGAGGCCATCTATT TGCTGTCCCCAGGAGTCCCCAACTGCTCAAAGAA CAGACTGTGGGCTCTGGAAGCTAGCAGGTGACCCC GGGGATGTTCTGAGCAGTGCCTTACTGAAGTTTAT CCAGGCCCTAGGGTCCCCTCAACTGCTCACACAGCC TAGGGTGGGTCTCTTGAGGAGTCACTTGTCACTTCT GTTGCTTCCCAAGAGACCCAGGGAAAAAAGGAAGGA AGGCCATG	386	D	—
IM000533	ATCTCACTCGTAAAAATGAACAAAGGGACTGCAGAGA TGGCTCTGAGCTTTTAAGACCATAGCCTGCTTTTCC AGAGAGCCCAGGCTTCATTTCACAGCCACATATGG CAGTTCACAACCATCTACAACTCTAGTTCTCTGGGGA TCTCACACTTTTGTCTTCTGTGGGCACTGCGCAAAT GTGCACAGAAATACACGCAAGGAAAAACACCCATG	387	K	<i>Fgf3/Fgf4</i>
IM000534	AAGAAACACTCTTAGCTGGGCCTGGAAGTGACATG	388	D	—
IM000535	CTAAAGCAGATTATTATACTTATTCTACTGACCATA ATGCAACCACTATTATATAAACAGAACATACTATAA AGTGAATAACATTAGGATACAAAATGTATAAAAGGG GAGAGAGGATAACCATGTGAAGTATGTTTAAATAA AATGTTTGGGATTTGAGGAAATTAATAAATTAGTTA CCCTTTTGTCTTTGGGGAAGAAAGGCAGCATG	389	D	—
IM000536	CAGCCCCAAACCCATCAGCCTGAGACTGATGCACAG GAGGCAGGCCAGTTAGTTATTCTCTGGGCCCTCTA TTTTCCTTCTGTAGGTTAATCCACCGCTCCAGT GCTGGAAAGTGCAAGCATTGTGGGAAGTTAAAAACG TGCCACCATG	390	D	—
IM000537	CATGGACAATGCACCCCTCAAGCAGTGTCTTCCATA CAGACAAGCATATTTATTTCTATACAGACAGCAAC TTTGTCTGAGGTGTAAGG	391	K	<i>Fgf3/Fgf4</i>
IM000538	GGATGAAGAAGCCCAAGGTATTAGGTCACTCTTGCT CTGACTTCTCACAGTAAAAATACAACCTCCAGGGAC TAAATGACACAGAACAGCTTAGCCTCTGGACATTG CTTTTGGATTGCAAAGTGATAAGTGAAAAAGTAATA AGTCTATCTACATTGGAAACATTTGGTAACCTTCAT TTAAACACACTTCCCCATG	392	D	—
IM000539	CATGTCCTACATTGGACATTTCTAAATTT TCCATCTTTTTTCAGTTTTCTCCTCACCATAT TTCACGTCCTAAAGTGTGTATTTCTCACG TGTATTTCGTTGGTTGTTGGTTTAGTTTCT GGGAGCTCTGGAAATCTGATTATT	393	R	—
IM000540	TGGAAAATGAGAAACATCCACTTGACGACTTGAAAA ATGACGAAATCACTAAAAAACGTGAAAAATGAGAAA TGCACACTGAGGGACCTGGAATATGGCGAGAAAACT GAAAATCACGGAATGAGAAATACACACTTTAGGA CGTGAATATGTCGAGGAAAACTGAAAAGGTGGAG AATTAGAAATGTCCACTGTAGGACGTGGAATATGG CAAGAAAACCTGAAAATCATG	394	R	—

IM000541	TGACATACAGAAAGAACACAAATACCTGTAGCTGCT GTGACAGGACCAACCATTCTAAATATCAAAGCAGCT GTTGACACCTAAGGACTGGTCTGACTGCTAGATCTA GGAGTTTCAACTTGCAAAGCTGGCTTGATGCTCAT G	395	C	—
IM000542	TTATATATATATATCGTTTTCTCTTACTCCTGAATC AGTGACATG	396	D	—
IM000543	CATGTCAGCCCTCAGCTTTACACAGGTGTCAAAAA AAAAAAAACACTGACTGAGATCTTCCGTCTGCCAT TAGCTGTTATTGTGTACATTAAGTAGAATCCACTGC TTAACCAGGCTACTGGGCTCACCCAGTATTCAAG GAGGTGCCACAGGACTCAAAGGATACAGAAGTTACA TATTAACCAATCTCGTAGAGGATTACAGAGGAAC TAAGTTTGGTAGGGGCACAGATTGTAGTACCATTAA GCCCCCTCTGTTCTCGTGGAGAACCCTACTGTCCA GCAAGGCGGAAGGACCAATCAAGCAAATGAGAC TTGTTCTGG	397	D	—
IM000544	CATGATANATCCCTTTTTGTGAGCATTCC ATAGCCTCAGTAATAGTGTCTGACCTTGG GACCAGCTGTATCCCACTNTGGGACCTT CTTTTCNTCAGGCTACTCTCCATTTCCAT TNCTGTAATTCTTTCAACAGAAACATTTA TGGGTCANAGGTGTGACTGTGGGAGGACA ACCCCATCCCTCACTTGATGTCCTGTCTT CCTGCTGGAGGTGGGCTTTATAAGTTCCC TNCCCCTACTGNCCAGCATTTTCATCAAAG ATCCCTCCCTAGGAATCCTGGGAACCTCT C	398	D	—
IM000545	GATAAGCTTATCTTGAACCTGAATGTATATGGAGAA GCAGAAACCTTGAAACAGCCACAGAACTGAAGAA GGATGAAGGTGGAACCTCTCAGCTGGAATATTCATG	399	D	—
IM000546	CATGTTCCAGCTGGGCAAGGCCTCGGGTTCCTCGG TGAAGAGTGTGGACCAGCCGATGAGCCCTCGACGT GTGGATGAAACGGCTGGCTTTGTTTAGTTTGT TAACCTCCCAACGAGACTTTGATCAGCTCCACCTC GAAAATGTTGCGGAAAGATGCGGAGAGCCTGAGGGA CTGCGGGGCAGCAACGGGCTCCGGCCTAGCCCGGCC CGCCGGCCCCCAGA	400	B	AI413288
IM000547	ACCAAGTGTTAATAATGTACTGATGGCTTCTGCCTG TGGCAGTACACTTGTCCTCTACACATG	401	C	—
IM000548	CCTTACTGCAGAGATGACTCGGCCAACGGCTTCGAG CCCCTGACCACTTCCTCAGGTTTGGTTTGTAGTT TTTTCTCACAGCAATGGGAAGCATAATCAATACAAC TTCCAGAAATGCGACCTGTGACAAGGCCAATGAGCA GACTCAAGGCTGGGCACATAAAGCACCAAAAAA AACTCCCTTGCAGTTATTGTTTCATG	402	D	—

IM000549	GACTGAGCCTGCCTGGGGCCGTAGGGAAG GGGGGGTTGGACCCTCTGGTATTTGCAGT TACCACTGACAGGGTTTTTCCGAGATGCC AGTGT CAGGGTGTTCGGTGCTGACCCCCC AGGGACCGTGCAGCCCCGATGGCTGTCTC GGTCCTCTCANCTTTTCCGCCACCCCTGG GATATTT CAGGACTCANTCCCCGCAACAG CTCTGACTGAGGT CAGCTCTGTGACCAGG GNCCCTGTCCCCGGTGTGNNGTGTATTTG CATG	403	K	Wnt1
IM000550	CATGTAGAAGGCAGAGGACAACCTTCAGGGATTATT TCTGCCCTTTACAC	404	C	—
IM000551	GTTCTCCATTCTGCTGCTTCTCCCTGATACATTGA GTTACAGCAGCCCACGCGTACACACTCTCGCACATG	405	K	Wnt1
IM000552	CATGCCACCAACAAATAAGTAAGTAAAAAGAAGGA AGGAAGGAAGGAAGGAAAGAAAGAAAACATTTTAAA TCTGTAAT	406	D	—
IM000553	CGGAGCTTAGGTCTATCATTTAAAGATACAACCAAA TAGGCAGAATCATTTCTGAGGAGCCCATTTTCTTT ATCTCAGGTCTGCAGATTCTCCCTGGTATTATCA GGGAGGAGCAGCAGCTGAGCTATCTATCTCCTTTA CTAATAGAAAAACGCCTTTAGGGCTTGAGCACAGG ACCTGTATTT CAGGGGAATGTTGACAATCCATAACT CCAGGGTGGACTACTAAGCCCTGCAAGGTGAGTGAA CCCCGGCCGAGAATAAGGCCCATG	407	R	—
IM000554	CATGGCCTGAGAGTTGGAAGAGTATTGTAAGCAGG GGTTGTTCCAGAAAGTTTAGAATATACAGACACTAT ACTCTATCCAGACTTCTTGGCACAGGGAGTTCAAAT GTAGACTCTGAGCCCCGTCTGGGCGAGCTTCTTCC ACCTGCTTTGGGTAGAAGCAGGCAGACTCTGGGTAG ACTCTGATTCCAAGGCTAAGTAACCCCTGAACCCAG AACAGTGTTTTTC	408	D	—
IM000555	CCAGATATCATACTGAGTTCGTAGGTGGTTTAAATT AATCACGGGCCCTGGCATG	409	D	—
IM000556	TTGGTGATCCAAACCCAAAGAGACAAATGCTGAATG TTCACTCTCATTTTCTGTTCTTAGCTCCAAATCTTC AGATATGAGTAAGCAACACATAAATTATGAAGGGAC CATACTGGGATGTAGGGGGCTTGACATG	410	D	—
IM000557	CATGAGCACTGCTCTAGGGACACCTCCCA TCCCTTCTAGCACCCCAAATGCCCCCTTC CCATCTCTCCTTCCAGAAGTTGGA	411	K	Wnt-3
IM000558	ATATAGCTGTCTCCTGAGGGCCTATGCCAGTGCCTG GCAAATACAGAAGTGGATGCTCACAATCATCCATTG GACAGAGCACAGAGTCCCCAATGAAGGAGCTAGAGA AAGTACCCAAGGAGCTGAAGGGGTCTGAAGCCCCAT AGGAGGAACATCAATATGAACTAACCAGTGCCCCCA GAGTTCCTTAGAACTAAACCACCAATCAAAGAAAAC ACATG	412	R	—

IM000559	CATGATAAGGTTAGAGTTTTGTGAGCCTCCTTAACC TTGCTCAGCAAGCGTTGGGCTCTTGGCAGCCGAGCT GCCATCTTTCTCATCCCCGATAGAGCCAGCCGCCCT TGTCGTGTCTTGAATAAGTTAGAGGAGGCATTATAG AGCGGACCTAAACATTGCGCTGGAGCCTGAGGGAT GGGGATTGGCTGAATGTGAAT	413	D	—
IM000560	CAGAACTGTGCTCTTTAGGAAGCCAGACGCTATGCC TTAGGCCCTGTTCCCTCCAGACCTTGCTCTGTGCTA CAGTGTAAGCGAAGATCATG	414	D	—
IM000561	GAGAATTAGAAAAGAGATAACAAAGCGAGAAAGAG AGGCGTGTGAGAGCATG	415	D	—
IM000562	GTTTCCAGATTGTCTAGTAGCTGGGCTGCAGGAAC AGCCAGCATG	416	C	—
IM000563	GGGGGTGGGGTGGTAAGAGAAGATTAATTAGCCTA GCATATATAAGGTTTTGGATTCAATCTCAACTCCA CCCCCTTAAAGAATAAATAACAAGTAGATAGATTAT AGACAGACAGCTAGATGGATAGACAGATAGCTACAT AGATACATAGATAGATGATAGATAATAGACAGACAG ACAGATAAATGATAGATAGATGATAGGAAGTCCCAG TTAACAAATGGAATAAAAAGACAAAAGTCCCCTTT GTCCATG	417	D	—
IM000564	GTATATGGAATATGGCAAGAAAAGTGAATCATG	418	R	—
IM000565	CATGGTAAAGTCAAGAGTACACCTGTGCTTCTGTG TTCTTCTGTGTGGCTGACAGCTGGGCAGAAGTGAG TTCAGGAGGNAACCCATACGATGAGACAAGCCGGG GCAAAGTGGGATATGTGGACCGCAGCACATCAGAAG GGTGTGCCCGACATAAAC	419	B	AA11135 4
IM000566	CATGAAGTATATTATTAGAGGGAAGTCTTACT GCTGAGCAGCGTGTGTCTTCTACAGAGGATGTTG TGTTCTGGAATTTAAATTAATTAAGTAATAGTGT CAATGAAACGTTGTCCGGTGAATGCTTCTTTTAA TGATCACTGTAGACAGGGA	420	R	—
IM000567	AATAATCAGATTTCCAGAGCTCCAGGAA CTAAACCAACAACCAACGAATACACATG	421	R	—
IM000568	CATGATTTGATAGGGTATTTGGTCTCTGGAATCT AACTTCTTGAGTCTTTGTGTATATTGGATATTAGC CCTCT	422	R	—
IM000569	GCAAATAGTCCTTTGTACCGAACTCCACACACTAA TGTAAGTGAATTATTTAAATTTATTCCTTAATCTTT TTTTAAAGTCCAGACTCTATCCCCCTCTTGTCAC CCTCTGATTGTTCCACATCCCATACCTCCTTGCCCTC ATG	423	R	—

IM000570	TTCCATCTCTTGATTCTGTTGCTGATGCTCACATC TATGTTTCCAGATTCTTTCTAGTGTTCATCTC CACTGTTGCCTCAGTTGGGTTTTCTTTATTGTGTC CACTTTCCTTTTAGGTCCTGGATGGTTTTATTGAA TTCCATCACCTGTTGGTGTGTTTTCTGCAATTC TTTAAGGGATTTTGTGTTTCTCTTTAATGTCTTC TACCTGTTGGTTATGTTTTCTGTAAATCTTTAAG GGATTTTGTGTTTCTCTTTAATGTCTTCTACTTG TTTAGCAGTGTCTCTGCAATTTCTTTAAGTGAGTT ATTTAAGTCCTTCTGATGTCCTCTACCATCATCAT G	424	C	—
IM000571	CATGAGTTTCTACTTTTTATAAAATTATATAAAG TCATTTAGTAGAACCTAGCTTTATTTAATTTACCA ATTAATATAAGGCCACTGATATTATTGACTTTTGTC ACTACAAAATACAGCAATGAAATAATCTTCTCTA GGCTCCTTCCTCATCAAAGTAGTCTTCAGCTCACA TTAATACTTTTTCAAGTTGTAAGGGACCTCAGGGA CAGGGGGC	425	D	—
IM000572	CATGAGCTTATAGTTTCAGTAAGAGAGCATAGATAG AATATAGGTGCCTGTGCGCTGGCTCTTTGGTTGTA TTTAAATCCTTTATCTCTGAGAAGTCGGAAGTGTG GCAACAGACAATATGGTAGCC	426	D	—
IM000573	CTGACACAGGTATGCCAGTCCATAGTGTGCAGAGC ACAGATGGCCAAGGATAACTAGGAATGAGACCTACT TAACCCAACTCCAAACATTATGAACTTTAAAAAA ATGACTTCAGTTGAACTTTGCAGGTAACCACATCAT G	427	D	—
IM000574	ATTGTGTCCTTTTAACATTCTTGCTTTAGTAGAACA TCCTCTGACCCGTATCTGATTCAAGTGAATAATCCT TCACGAGTCTGCCTTAGCAAAACATCCTTTCACCTG TGTCTGCTTCAGGAAAACACCCCTTCACATG	428	R	—
IM000575	CATGTTGGTAACAGATACAACAAGCAGACTTAACT AATAAGAAAACAGCTATGATTAATATGTTTATACT TAGCTGAAGAGAATGTATGGAGCTTTGAAGTTAATC TTTTCATATACACAGGAATGCCTTCAAAAAGCATTG CAGCAGATTTCAAAGGATTAAACTCAT	429	D	—
IM000576	CATGTGGCGAACCAGCATCACTTTTGCTCTTTCCTT ACTAAGCCAGGACATCCATCATTATTTAATAGCAT CCACCTAGTAGATATAAGGTGATACCTTATTGTGA TTTCAATTTGCCTTTCTCTGAAGATCACTAACAATCA AAATCTGGTTCATTTTATTATGAATTCTCATTTGT CTTTGTGCTAAATATATGTTTCAATCTTTTCAATT TAAAGCAAATTGTTTGTGTTAATAATGAGCTAACTT TTCATACATTGAAG	430	D	—
IM000577	TTGCTGTGGGCCTAATTCAAGGCTGATAG ATCACCACAGAAGGACACTGTTTTCCTCC GGGCAGCAGGAAGTACAGGGTAGGGACTC TAGAATCACTGCCCTAGGGCATG	431	B	A1663969

IM000578	GTACTTGAAGTTTTAGCTAGAGCAAAAAGACAATGG AAGGAGATCAAGGGAATACAAAGTGGGAAAGAAGTC AGAGTATCATTATGTCCAGGTGATATGATAGTATAC ATAAATGACCCTATAGATTACACCTAAGACCTCTAC AGTGGATAAATACTAAAATATTTACTACACAGAAAT CACCCCATG	432	R	—
IM000579	CATGCAAGGTATGAACTCACTAATAAGGG GATA	433	D	—
IM000580	CATGGTTCACACTCCATAATATCTTGTCTCACTAA TTCCTCTAATCCCATATATACACCAATAATTTAAC AAGGGAATTTCTACATTGATTGTAAAGGGAGAT ACTGTGTGAACCTACCAACAAAAGTCTCCAATAGA AGTGTGGATACCACAGGAAGTCTTGTGACAACCAT AAAATTTGGGTCTGATAAGAAGATAACCCTTAAAT ATATAGATTTATGTAAAG	434	D	—
IM000581	CATGGGCTGGGGAAGGCAGAGAGAAGAACATCTGG ATTGTTCTAAGCTTTGCCTTTAAATGAGACTTCAA TAATACTTAGACGTACCAGCTTCTCAGTCAGTTA AAATGTGACACACACCTCTCAGCAGACTGAATGG GTGAG	435	D	—
IM000582	AGAGATGGTTGGGATTTAAGTTACCAGGG TAGGGTCACCACAATCAACCCTTGATGCC TTTATAGGAAGAAACATG	436	D	—
IM000583	CATGGAAGTCTAAAAGACATTAGGTTCTGGATGGAA GAAGAGAAAATTATCTTTAAGTTTGAAGAAAGGGAT GATAAAACAAGTCTTAAATCTTCTCAATTTGCCAT AATTCATTTGAATTAATATTGGTAAATGCTTTGTGT GGTCCATAAAGTTCAATGTGTATATCACTAAGTA GTTATTTGTAAAATTATAAATAGCCTCTAT	437	C	—
IM000584	CTTGTGAATTGTTTAACTGTTTGAAGAAAGTAGATG TTTTCTCTATTATTTTGGGACAATTATCAGAATT TGAAACAACTGTGTATCTCTATTACTTTCTGCT TAACCCCATG	438	D	—
IM000585	CATGGTTGCTATATTCATTAAACACAAATCATTTAAA ATCCTTAATGTAAAATGGGCACATTTTCAAAATTAA AATATATGAAAACCAATAAGATAGAAAATTTAGGA AAAAAATAATCCAAGCAAGATGTTAACATCCAACC ACAGCAGCATATTAGCAGCAGGACAAAATAAGGAC AACAAACCAAGAAAGGGATTGTGGTTAATGTATGCCT CATTGGAAGGGATAATAGGATGTAAAAGTGTGACAA TAAAGAGAAAAAATCTCTTTTAAATGTAAAGTTAA AATAATAAAAAATAATTTAAAAATGGTGTCTCAGG GCTGGATAATATTACTAACAAAACAGGGAATTATT AATAAAAAATCTCTTATCAGTTAT	439	D	—
IM000586	AACAAGTTTTAAATGGGGCATAGTGGATCACATTG TGATCCCAGCACTTGAAGGTAGAAATAGGTAAATT AAGAGTTCAAGGTCATTTCTCAGTTATGTAGTTGTA CATTTCTAGCGATGTAGTTGAGTTCAAGGCCATG	440	D	—

IM000587	GTCTCCAATGTGCATTCTCATTCTTTCACGTTTT CAGGGTTCTCGCCATATTCATG	441	R	—
IM000588	AATTGCATTGAATCTGTGGATTCTATTAAACAAGAT GGCCATTTTTTCTATGTTAATCGTACTGATCCAT CAGGATGGCAGTCTTCCATCTTCTGATATCGGCCT CAATTCTTTCTTCAGGGGCTTGAAGTTATCGCCAT G	442	R	—
IM000589	GGCTAGGTACTCCTAAACCTTCTCTGCTATCCTAG GCCCAATAGAAAAAAGTGGCCCATG	443	D	—
IM000590	AATAATACTTTCACTGTACTTTAAATATTATCTCC TATCTCACTCTAATACTTCTGTGAAAGAAGCAATAT CGTCTCTTTGTAGATAAAAAATGGCTGAGAAGGGCAC CTTCAAGACACTAAGTGACTAACTCAGACTCAGAAG TTCAGAGACCATG	444	D	—
IM000591	CATGCTCTACTATGTTACAGCAGTCTTATTTATAA CTTCCAGATACTGGAAGCAACTCAGATGTTCTCAA TGTAAGAATGGATACAGAAAAATATGGTACATTTA CACAATGGGGTACAACCTCAGCTATTAAGAACAATGA C	445	R	—
IM000592	AAAACCCAAGAACAATTAAGCTGTAGTTC CCAAGTGTAATTATATTATGGTTGTTTCT GCTTGCTTTATATCCCTATATACAATTTA TGATTCAAGTATTAGTGGGAATAGACTAA TGGCATG	446	C	—
IM000593	CATGCCAAGCCTTCTGGTATCACCCTAAAGGC	447	C	—
IM000594	CATGCTCTTCTCTGCTGTTCTTACTGAATTTTAAAT AAGAACAATTCCACACAGCTCGAAAGCACTGCTCAA TTAAGAGATATTCCTACCAGGCATCTTTGGAATCCT GCAAGCACCTCTTCTCTGTTTCTGATGACCCTCAA TTTGGTTGTGTCCAGAGTTGGTGGGGAGGAGGGGA GGGGAACGAAGCTTATTTTTTTTAAATTGCAAGTT CAATTTTACAATGTTCTCGAT	448	D	—
IM000595	CATGCTAGGCAAATGCTCCACTGAATGAATTACATT TCCAATCCTTTAGATGCATTTTAAAGAGAAAAGATT GAGTACTGAAGTTTGAATAGAATACAGGAATAAGG GACTAAACATATATATAGCCTTATATAGAGAAATAT TAAGTAAGTAGTAACTTTGCTTGTGTGTGTGTGTGT GTTGCACAC	449	D	—
IM000596	CATGCCATTAGTCTATCCCACTAATACTTGAATCA TAAATTGTATATAGGGATATAAAGCAAGCAGAAACA ACCATAATATAATTACACTTGGGAACCTACAGCTTAA TTGTTCTTGGGTTTT	450	C	—
IM000597	CATGCACAGCTGGTGAGTGAGTTGCTTCTGCTGATA AAAATCTCTCACAGGCACATTTACAAGTGCTTATA TCTTTGCTAGCTTCAAGAACAAGGAAGGGACACA CAAAAGCTCTTCTGAGTCTCCTTCTCCTGCTGTTAT TTTG	451	D	—

IM000598	ATCGTCAAAGTTAGCAAAATTATAAATGTGAAAGTC ATG	452	D	—
IM000599	CATGAATTATGTTTGTGTTTTATTTCTTTTG TACATCATTCAATGCAGTAATCTAAAGTT TGGGGTCTTGGTCTTATATCTTGGAACCTT CAGTGACTTATTGGTTCTAACG	453	D	—
IM000600	AGAGACAGTCACAAAAGGGGCCCATCTTGTTAAGA ATGGGCCAGTGGAGAAGTTCGGGTTAGTGGAGTAGC CTGCCTCAGTTTCCTCCTGTCTTCTGTAGTTAAATG TGTTAATGGTTAACATG	454	K	<i>Fgf3/Fgf4</i>
IM000601	CATGTAGCATTTATCTTAGCCAGCAC	455	D	—
IM000602	CATGTACAGACTATGAACAGGAAATGTTTTGCAAA TAACTCTGTGCATTAGAATTTCTTCAGAAATATAA CCATTTTGACAGTTGTAGGTTACACTTTTAAATTA CAAAATCAATAAAATTGATCTACAACCGAGGCCCTA CAAAACCCTTGCTGGATATTGAAGACGGCATAATAT TAAAG	456	D	—
IM000603	AATCCCACCACCCACAGGGTGGCTCCATAACCATC TGTAACCTCAGTCTCAGGGACTCCAAGGCCCTCTTT TGGCTTGCAAGGGCTTGACACACACAGCGCACACA TG	457	K	<i>Fgf3/Fgf4</i>
IM000604	CATGGTGAATGATTGTTTTGATGTGTTCTTGGATTT GGTTTCGAGAATTTTATTGACTATTTGGCATTAAT ACTCATAAGGGAAATTGGTCTGAAGTTCTTTCCTTG TTGAGTCTTTATGAGGGTATCAATATAATTGTGGAT TCATAGAGCAAGTTAGATTGTGTTCTTCTGTTTAT ATTTGTGGAATATTTTGAAGAGTATTGGTATTAGA TGTTCCCTGAAGGTATGATAGAATTCTGAACTAAAC CCATATGGTTCTGGATTTTTTTTGGTTGGAAGACCA ATGACTGCTTCTATTCTTTAGGTGTTATGGGACTG TATAGATGGTTTATCTGAACCAGATTTAACTTTGGT ATTTGTTATCTGTTTAGAAAATTGCCATTTTCATCC ATATTTCCAGTTGTGTTGAGTATAGGCTTTTGTAG TAGGATATAATGATTTTGAATTTCTCAGTATGTT TTCTTATATCTCCCTTCCATTTCTGATTTTGTAA TGTGGATACTATCTCTGTGCTCTGTTTAGTCTGG CTAAGGGTTTTCTATCTGTGATTCTG	458	R	—
IM000605	CATGGGTAAACAGTGGGCCCTAAACTGAACTAGAA AACTTAAAGATGCTCATAGGGAAGAAGAAAAGAGCA GAAAGCTTAGCTTCTAGACAGGGGTAAAGCTTAGAG CTCAATAAAAAAGGAACCCC	459	K	<i>Wnt1</i>
IM000606	CATGGCCTGTCTCAGTTTACTTCACAGCTGAACAAG AGGCAGAGAGTGACAGGTAG	460	K	<i>Wnt1</i>

IM000607	CATGCTCGCCAGTCCCAGAACCTGGAAGG CTGAGGCAGGAGGATTAAAAAGCCTTGGG GACACCAGGCTTGGTGGCACCAGTTCGTAA ATCCAGCACTGGGGAGTTAAGAAGCAAGT GAGTCACATCTGTGAGTCTGAGGCTATCT TGGTCTACGTAACCAGCTCTAGTATAGCC AGCCTGGGATACATAGTAACCAGTTCTAG TATAGCCAGCCTGGGATACACAGTAACCA GTTCTAGTATAGCCAGCCTGGGATACACC	461	D	—
IM000608	CATATGCGTATTACATTGTGTGGGAACGTCCTTG GAGAAAGCAGGAGCAGGAGTTACAGACAGTTATAAG CTGCCTGACCTGGGTGCTGGGAAACACCTCAGGTCC TCTGGAAGAGCAGTAAGTCCCCTTAACCAATGAACC ATCTATCCGTCCAGCCTACATTTAATTTGTTTTCTT ATTACTTTGTCTGCATG	462	R	—
IM000609	CACACACACACACACCGGCTGGGGATCCAACCCAT CTCGTCCTTACAGTGCTCTACCATCAGCCACACA TTTCCAGCACNTTATCTGAAGTGTTTCTTTTATT TGTGCATG	463	K	<i>Wnt1</i>
IM000610	CATGCCTGGTGCCTGCAGAGGTCAGAAAGTGTGGA TGCCCTGGAATTAGAGTAACACATAGTTATAAGATG CTGCGTGGGTGCTGGGATTGAACCCCTGTCTCTG CAAGAGCAGCCAGTGCTCTTAACCACCGAGCCATCC CTCCAGCCCCGATTACTCACTCTTCACGGCCTCAA TCTTGTAAGGAATATTGAGGCTGCCAAGTGACGCAA GAGCACCTAGGAAGGCAGCCACATCGGTGGCACTCT GGAAGCACTGCGAGGATGACTGCACACATTGCCGGT TGTC	464	K	<i>Notch1</i>
IM000611	CATGCTGGCCATTTATTTTGATTAAAGTTATACTCT AGACCTTTGTAAATATTAGCCATTGCATATTACAGA AATTTCTTAGCAGAGATAGTCTCTCACTCTTAGTGA TGAGCAAGCTGGAGCTCAGCATTATTCTCCAGCTA AGATACAGAATTACAGACGTTTATGACGGACACATC TTGGATGTAGTTACTTAGTCCAC	465	D	—
IM000612	CCCCCCCCGCCCCTGCCAGACCGCAGCCCCAAGCAC AGCATG	466	D	—
IM000613	CATGCCTCCCTCAGCCTCTCCACCCCTTCTGTCC TGCCTCCTCATCACTGTGTAAATAATTTGCACCGAA ATGTGGCCGCAGAGCCACGCGTTCGGTTATGTAAAT AAAACATTTATTGTGCTGGGTTCCAGCCTGGGTTG CAGAGACCACCT	467	K	<i>Fgf3/Fgf4</i>
IM000614	CATGAATTCAATGGTGTGCTTGCTATAAATGCAAAT AAACCATATATATCATATTACACTCAATTTTAAATA TTTTTCCTAATATTAATAAAGGTGATGGGGAACCTT	468	D	—

IM000615	CATGTCTACTTTATTGCATATTAGGATGT CAGGTCCTGCTCGTTTTCTGGGACCATT GCCTGGAAGACATTTTTCCATTCTTTTAC TCTGAGATAGTTCCTGTCTTTGTTGTTGA GGTGTGTTTCTTGTATTAGCAAAATGCT GGATCTTGTTTGCGAATCCAGTCTGTTAG CTTATGTCTTTTACAGGTGAATTGAGTC CATTAAATATTGAGAGATATTAAAGAGAAA TGACTTTTGGTTCCTGATATATTTGTTTT TCTAGTTAGTTTTGTGTGCTTGGGACTCT CTCCCTTTGACTGTGTTGTGAGATGCTTA ATATCTTGTCCTATCTTTGGTGACAGGTGT CTTCCTTGTTAGAGTTTTTCATTCCAGG TTTCTCTGTAGTGTATGTTAGAAGACAT ATACTGCTTGAATTTAGTTTTGCCTGGAA TATTTTGTTTTCTCCATCTATGTTGATTG AGAGTTTTCTGGGTAAAATAGCCTANCC TGGCATTGTGTTCTCTTAAAGTCTGTA TGACCTCTGACTANGCTTTTCTGGCC	469	D	—
IM000616	CATGGTGAATGATTGTTTTGATGTGTTCT TGGATTTGGTTTCGAGAATTTTATTGACT ATTTTGGCATTAAATACTCATAAGGGAAAT TGGTCTGAAGTTCTTTCCTTGTTGAGTCT TTATGAGGGTATCAATATAATTGTGGATT CATAGAGCAAGTTGGATTGTGTTCTTCT GTTTATATTTTGTTGAATATTTGAAGAG TATTGGTATTAGATTTTCTTGAAGGTAT GATAGAATTCTGAACATAACCCATATGGT TCTGGATTTTTTTTGGTTGGAAGACCAAT GACTGCTTCTATTTCTTTAGGTGTTATGG GACTGTATAGATGGTTTATCTGAACCAGA TTTAACTTTGGTATTTGTTATCTGTTTAG AAAATTGCCCATTTCATCCATATTTCCCA GTTGTGTTGAGTATAGGCTTTTGTAGTAG GATATAATGATTTTTTGAATTTCTCAGT ATGTTTTCTTATATCTCCCTTTCCATTTCT TGATTTTGTTAATGTGGATACTATCTCCG TGTCCCC	470	R	—
IM000617	CCATGTCAGGTGGTTAACCTGTGAGTCTAACTTCCA GGAATGCAATGCCTCTGGCATCTACAGGCATAAACA TACTGTGGCTTACACTCAAACGACACACCAACAC ATATGTGCACGCGCACACACACACACCAAAATTAA AAATAAAATAACCTTTTTAAAAAATATAGAATCT ATAGATAATTGCTTTACTGCACTCACAACATTTTA GGATC	471	D	—
IM000618	ACACTAACACAAAGAAGGGGATC	472	D	—

Table 3

5	MOUSE NOMENCLATURE ICSNM Fscn1 Celera mCG23208
10	HUMAN NOMENCLATURE HGNC SNL Celera hCG15970
	MOUSE SEQUENCE - GENOMIC
15	CCTCTCAAACCTCTGGTAATCTCCTGCTTCGGCACGCTGGGACTGGGACTACACCTGTGTGCCACCATGGCTGGCTATTCTCT CTCTTGAACACTGGAAGAGTGCTCAGAGTTTACTGGATCTGGGAGAAGCTCGAGGCTGGGTATGGAAGCCGGCTCTGCTTGCTCC AGCTCAGGGAGGAGTTGCCTGAGGGCCAGGCACTTCGAAGGACAGATGGGACCCAGGCCAGACACTGGGCCCCAGCTCACCAGAA
20	GTGGAGCCCTGACTGTCTCTGAGAGGGTAAGCTGGGGTGGCTGCCAGGCGGGCAAGGCCAAAGCCTGGCAGCAGCCGGTGGCCCT CTCTGGCAGAGATATCTTGGCATGAGCCTGGCTCTGCCATGACACTAAAGTGCCCTCTTAATTAGCCAGGCTCTTGCCAAAGCAC TGGCCACGATTGCCCTGTTCACAGAAATCACCTTGGACTGGCAGATGGGGAGGGTGGATAGCCCGGTGTTTGTCTTTCTTCT
25	AGGGGAGCTGGGCTCAAGGGCAGGACTCCTGGGCGAGCCAGGTTTCCCTCAGAAACCAAGCATGAATCTGGCATGTATGGAG CACACCTGTAAATCAGCAGAAATTGAGACAGGAAGATTGTTGAGAATTGAGGCCAACCTAGGCTAAATAGGGAGACCTATCTCTA CACACTCCCCCTCCCCCGCCCCCTGGAAATGCTGGAGGGTCTGGGGAAGATGGCTCAGTGGTTAAGGGCACTTGCTGCTCTTGAG
30	GGGACCCCAAGTTTGATTCCAGCATCTATAACTTGGTGGCTCACAATTCAGTTCAGGCACTTGACACCTTCTGTGGTCTGCA AGGCACCTGCAATTCATTCTCACGTGCATGCGCACACACATGCGCGCGCACACACACACACACACACACATCTCATAAA TACAAATAAAATAAATCTTGAAGAACACAGTGACAACACACATGCTGAACATGGTGGTGTCTCTGACATGGTGGTGTCTCTGACA
35	TGGTGGTGTCTCTGACATGGTGTATGCTCTGACATGGTGGTGTCTCTGACATGGTGGTAAGCCTGACATGGTGGTGTCTCTGACAT GGTGGTGTCTCTGACATGGTGTATGCTCTGACATGGTGGTGTCTCTGACATGGTGGTAAGCCTGACATGGTGGTGTCTCTGACAT GTGGTGTCTCTGACATGGTGGTGTCTCTGACATGGTGGTGTCTCTGACATGGTGGTGTCTCTGACATGGTGGTGTCTCTGACAT
40	AGATAGACCTGTCTCAGAAATAGGCTGGAGGCTGCCTCTGCCCTTTTGCTTCTATCTCTTTTCCATATGTGTGTGTGGTGTGTG CATATGTGTATGCATATTTGTAAGTATATGTATATAAATAAACAACACACACACACAACTTACTCTGTATATAGGCTGGCCTTGA ACTCAGAGACCTGCCTGTTTCTGCCCTCCAGTGCTGGGATTAAAGCGTGTGCCATGGGCTGGTGTAGATGGCTCAGTGGGTAAAG
45	GTACTCTGACTGTCTTCCAAAGGTCCAGTGTTCAGTCCCAGCAACCATGGTGGCTCACAACCATCCGTAACAGATCTGACGC CCTCTTCTGGTGTGTCTGAAGCAGCTACAGTGTACTTAAATAAATAAATCTTAAAAAATAAATAAATAAATAAATAAATAAATAA CCACACTGCCCGGCTAGTTAGCTTTATCTTCCGTGGATGTTTTGTCTGCAGTATGTCTGAGTGAGGGTGTCTGAGTCTCTGTAAC
50	TGGAGTTATAGACAGTTGTGAGCAGCCATGTAAGTGTGGGAATTGAATCCGGGTTCTCTGGAAGAGCAGTTTATGCTCTTAAGCA CTGCGCCATCTCTCCAGCTGTCTTATTTATTTTAAAGGTTCTCTGTAGCCATACAGGCCAGAAACCCACATTAGCCACGGACC TTGAGCTCCAAGTGTCTGGGTGACAGGCCCGCATCTCTCTGGTTTGTGATCTGCTAGGGATGGGGTCTAGGACCTCACACAGGCTG
55	CATAAGCATTCCCTCACCACCCCTCATCCCCACCCAGTCTCTGGACAGGCTCTGGCTGTGTAGGCTGGTCTCTCTCTCTCTATCCC CCTGCCCTCAGCCTCTGAGTGCTGAGGNN NNN
60	TCACAGGTTCAAGGCCAGCTTGGTTTACTTGAGACTCTGTCTCAAAAAGACCAAAACAGGGACTGGGAGGATGGCCAGTAAATATGC TTTTCCAGCTATCGAGGGAACCTGAGTTTATCTCTGAACTCATACAAAAGCTGGCTGTGGTCAAGTGGCGCATGCCCTTTAATCC CATCTCAGGAGACAGAGGCAGGCAGATCTTGAGTTTCGAGGCCAGCTGGTCTACAGACTGAGTTCCAGGATAGCCAGGCTAC
65	ACAGAGAAACCTATCTTGGAAAAACAAACAAAAAACTAGGTGTGGCTAGCCTGTAAACCCAGTCTGGGTAAACAGGGG CAGGTGAATACATCTCCGGGATTCGCCAGCCTGTCTATCTATGAGCTCTAGGTCTGGGGAGACAGCCTGTCAATCAATGAAGC AGGTGACAAACCGAGGAAGACACCAAGGTTGATGCACGGGCAAGTGTGCACACACACACACACACACACACACACACACACAA
70	CCAAAACCATATTTTGTGTGGTGGTGGTGTGTTAAATTTTATTTATCTGTGTGTATGGGTATTTACCTGCATGAATATCTACCT GTGTAGCATATACATCCCGGCTACTTTCCGAGGTGAGAGAGGACATCAATCCCGTAGAAGTGGAGTTACAGAAAAATGAATCTGT GGCTCTCTGGGAATCTAACTTGGATCTCTAAAGGACAGGCAGGACTCTGAATCTTGTAGCCACAGATACAGCTTTCCAAACCATG
75	TTTTGTAAAGAGCCACAGGCTGAAACTCTGGGCCATGTCCCGTTTGTGTGTCTAGGCTCAGTTTCTGGAAGGCAGAGAATG CGTAGGTCCGTTGTAGTGGAGACAGCAGTGGTGTAAACAGCTGTCTACCTCTTGGTCAAGGGAGGAGCGGAGGAGTAATCT CAGGGCCTGGGGCAACACCCAGCTGGGCTGGGCTAGTGGGGCTCAGCCAGGCAGGACGTGGGCTCTCTACTCTCTCAAGCTC
	TGATGGGCAAGTGGTGCAGTGGTACAGGCTGCCCTGAGGGCCCTTAGAGCAGGTGACCACAGAGCCACAAAGAGGCTATTCTAT GGCCTCCGGTTCACGAGGCTGCCCTTTATTGAGGGCTTGAACCCAGAAAGCTGTGTGGTCTGCAGGGAAGCTAGTTCTGAGCTG TCTGGCCAGCTACAGTAGTGTGTGTGTGTGTGTGTGTGTATACACATGGTACTTTTTCTATCTATCTATCTATCTATCTATCT
	ATCTATCTATCTATCTATCTATCTATCTTGTGTCTATGTATCTAATAATAAATGATCTATTAACTATAGATATCAATCCAT TGATCTATGTATCTATCACTGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTAT GTGCCATTACCATTTTCATAGCAGAGGATGGTCTTGAACCTCAGGTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCT
	GTGCCACCACGCTGGCTTAGGAGGTTCTGTGGTTAGAATCCAGGATTTCACTATCAACTGGGCCATCGTCAGCCATATTCAAT ATGCTTTCTTTTACATTTTACTTTTACTACAAATGGGTCCAGGAACCAAGGTCGGAAGCCTGATGGTGTGTGTCTCTCCCT GCTGGCTGACTTATTGCTCTTTTTTTTTTTTTTTTTTTTTTCTAGACAGGGTTTCTCTGTGTAGCCCTGGCTGTCTGGAATCA

198

199

TTTAAAGAAACCCGCTGCCACTGAACTAAATCCCGAGATTTTTTTTTTTTAAAGTTTTTTTCGAGACAGGGTTTCTCTGTGTAG
 CCCTGGCTGTCTGGAACCTACTCTGTAGACCAGGCTGGCTCGAACTCAGAAATCCACCTGCCTCTGCCTCCCGAGTGCTGGGAT
 TAATGTCTTATGTATCCAGACTGGTCTTGAACCTTGGTGCATGCCTGGAGTATCCTATTTTGATTGTTTATGTGTATACCCCTAA
 TATGGATGTGAGAGATTATATCATATGTGCGCTTTTGGTCACTCCATACCTTTGGGGGATGTATGGGGCAGGGATGGAGTC
 5 TAGCCTGGGCTGTGGTAACACACGCTTTTTCATCCAGCATTAAAGCAGAGATAGGTCTGATCTCTGAGTTCTAGGACAGCCTGGGCT
 ACACAGGGAAATTTCTGTCTCAAAAAAAGAAAGAAAGAAAGAAAGAAAGAAATAGAGTCTCCCTATATAGCCCT
 GGCTGTCTAGAACTTATTATGTAGACCAGCTGGTCTTGGACTCAACACAGAGATCCATCTGCCTCTGCCTCTGAATGTCCACT
 CTCTGCTTGGAGACAAGAATCGCTCAGTGGCCCGGATTAGGGATTAGCTAAGCTGGTGGTCCCTGAGCTCCAGGCTCCATCT
 10 GTCTTGGCTTCCCTGTGACAGGATTATCGGCTCATGCCACCGCGCTGGCTTTACACCATTCTAGCGATCTGAATTTAATACTC
 TATGGTCAAGCCATCTTCAATGCTCCCTCCCTCTGTTGAGACAGAGTCTTACTACTCGGTAGCTGGGTCAGAACTCAC
 AGTTAGTCTCCCGTTTGTCTTCTGAGTGGTGAAGTCTTCTGGCTAGCCCTTGGCTGTGATTTGGTAGCTGGTCCCGCCACTG
 CTTAGGATTATCACTGAGGAGTTAAGCCACACTTCAGGAAGCCCTGTGGATCCTGGAATCTGAGTGAGACAAGGGTCACACAGTG
 GCCTGACCGGCTCTGGTCTCTCTCTGAGGAATGGACCTGTGAGCAATCAGGATGAAGAGACCGATCAGGAGACCTTCCAGCTGG
 15 AGATCGACCCGACACAAAGAAAGTGTGCTTTCCGACCCACACGGGCAAGTACTGGACACTGACCGCGAGCCGAGGTGGCAATCC
 ACTGCGTCCACCAAGTGAAGTACACCTTACACCCCTTATCAGCTGGCTGGCTCTTCCCCAGGACTGGGCGAGCTGCTCGATGC
 CCCCAGTGTGGCAGCCCTCTTCTCTTCCCCAGGAACCGAGCTGCTACTTTGACATCGAGTGGTGTGACCCGCGGATCACTCTGA
 GAGCTTCAACCGGCAAGTTTGTGACCGCAAGAAATGGCCAGTGGCGCTGGCGCTCGGTGGAGACAGCAGGATCACTGAGTCTG
 20 CGTACCCTAAGCCTGTTTCCCTAGTACCCGCTGGTCAACCATCAGTCCACCTGGACCTCTCTGTGTGTTTCAAGGAATCCCTGTAA
 GCTGGTGTACCTCAGGCGCAGCAGCTGTGACCTTCTAGCTTCTTGGTATCCCTCTCTGTGAGCCATTCCCTGACTGGCCCATCTT
 TGTCTGTGAAAGCTACTGGCTCCCTTTCCCTGTGGCAGGGACTCGGAATCTTCTCATGAAGCTGATTACCGCCCTCATCT
 CGTGTTCGGGGGGAACAGGGTTTATTGGCTGGCGCAAGGTACAGGGCAGCTGGATGCCAACCGTTCAGTTACGATGTCTTCC
 AGTTGGAATTCATGACCGCGCTTACAACATCAAGGTGGGTCTACTGGGTGAGGATGACCTGGCCATTCAAGCCGACATTAGG
 25 GGAAGCAGCTAGGAGAGTGGTCTGGCTTCAATCTGGGAATCGGAGACAGGAGAATTATCTTTTTTTTTTTTGGTGTGAGG
 ACAGAACCCAGGGCTTTGAGCTTATTAGGCAAGCATTCTACTGTGAGTTAAATCCCCAACCCCAAGAATCATCTCAAAAAAGAAAG
 AAAGAAAAGGAAAAAGAGGTGGAGCCTGGTGGTGGTGGCGGCGGCGGCGCACACGCTTTAGTCCAGCAGCTCAAGAGGC
 AGAGCAGGTGGGTCTCTGAGTCTTGGCAGCTGTCTCTACAGATACTTCTAAGACAGCCAGAGCTATGACAGAGAAACCTGTCT
 TCAAAAAACAAACAAAAAGGGGTGGGGAGAGAGATAGAAGATAAGGATATTCTTCTTAGCTAGCTGTGGGACCAAAACAGT
 30 GAGAGGACACAGCAATCCAGAGGTGTGAGTCAAGATCAGAGCCCTGTGCTGTGTGTGGCCTTAGCAAGGCAACCGGACTCCCTTC
 TTACAGTGTCTGAGGACTGGACTCAGAGCTAAGATCCAGCCCTCTGGGGGATTCTAGGCGAGGGCTCTACCACTGAGCCAGCC
 CCCAGCCCTCACTGGGGATTCTAGGCAGGTGTTTACCACTGAGCCAGCCCGCCAGCCCTCACTGGGGATTCTAGGCGAGGG
 CTCTACCACTGAGCCACACCCCGAGCCCTCACTGGGGATTCTAGGCGAGGGCTCTGTGCTGATATATGCTCTTTTGTGTTGTT
 TACTGTGTTGTTGTTGTTGTTCTTATTGTGGCCCTAGCTGTGCTTGAACCTTGTCTTGTAGACCAGAGATATACCTGTCTCTGCTGCC
 35 AAATGTTGGATTAAAGGCATGTGCCACCATGCCACCTAGCTAGCCCTCTTATGTTTGTAGTTTGAATGGCATGTGAGTA
 GATTTCAGGATGGCTTGAATCTAGGTAATCTCTGCTCAGTTTCTTGTAGTATTGAATTTATGGGACTGTACCTTACATCCA
 GCTGAGCCCACTCAGTTCTGGAAGCTGACAGCGGAGGAGTGTAACTCTTGGGGACTGCAAGGTGGGGTTAACAATGTAGTCT
 CCCTCTCAGACTCCAGGGCAAGTACTGGACGGTGGTGTGATTCTCGGTACCAGCAGCAGCGACACCCCTGTGGATTCTT
 CCTGTAGTCTGTGACTACAATAAGGTGGCTCTCAAGGTGGGCGGCGCTACTGAAGGGGACACGCTGGGGTCTGAGAGGCT
 40 GCGCGGAGCTATGACCCCGCTCACTCTGGGAGTCTAGGCGCACTGCCCTCTGAGGCGCTCTCGTCACTCCCTGCTGCTGTTA
 TCCTTACTATCGGGTGGCCCTGAGCAGGTGGCAACCCCTTGCCCTTCAAACCTGGAACCCAGAGAAACGGTGCCCTTGCTG
 TCACCTCTGTGGACCCCTTTTCCCTAACTCACTGCTCCCATGGGTGGTGGCTGAGACTGTCCCGAGGAGGACTCTGGTTCC
 CTCTGTCCCTCTTCTTCCATGGGAACTCTGGACCTTCTTCTGACCTCAGTCACTCTGAGCCTTATTTCCCGCCAGGAAGTGG
 CTTAGAGAAAGCTCAGGGCTAGGGCTTACCTGAGCTTGAACCTGGAAGACCCGCTCCCTATCCCGCTCCCGCCCCACCC
 45 ACCCCACCCCTGCTCTGGCCCGAGCCTCTGGAGGCCAGCCTTTTGGCGGAGCTGAAGCCGGGATGGCCAACTTGGCCACAAGT
 TTTTCTGGATCTTGGCTGGAAGGAGTCTGTCCCATCTGCAGTGTTTGGGCTGGCTCTTTGACTCAAAGCTAGCTAGGTGGCA
 CTTGGTCTGCTCTGCACATTCTGGAAGGGCGGCGCTCTACCCACCTCATTCTTTTCCCGCTGGCTGAGTGGAGCAGAAA
 AATGACCAATCAGTATTTTTTTTTTTTCTTAAAGAAATGTTACTGTTGAAAGGCCCTAGGCAAGCCTGCGCTGTGTTGTA
 GTCTGTAGTGGTCTTGGGGGAGATGCTGGCTCTGTCCCTGCTCCCGAGCGGTTCCCTCCCTCCCTGCTGCTGACCCCTG
 50 AGCTCTGGCTCTGTGATTGGTGTCTCCAGCTTCTCCAGACACTCTGGGCTCTGGGCGGAGAAAGCGGAGGAGGCTGATGTA
 GGAGCCCTGGAGTAACCTCAGGGGCGCTTCCCAATCACCCCTTCCACCGACCCCTCAACCATGCACTCTCACTCTGGGTGT
 CTCGCTCTCTTATTTTTTGAATGTCTTCTATACTCTGAAGACCATGATAGTAACTTTGAATGGAAAAATAAGTAAAA
 TCAAGTCTCGGCGCGTGTGTCTCAGGGGAAGTGGATGCTGGAGTGGGAGAGGCGGCTGGGAGGAGGAGGCTGATGTA
 55 TTGGGACCCCGAGACTCTGTTTCCGCTCTCGGACCTAGCGGCTTCAAGTATGCTTCTAGTAACTCTGAGTGAAGATGGCTGA
 CACGAGGTTCCCGAGCTTACAAGCTGGGAGGCTAGAGGTTTCAAGCAGTAAAGTGTGTGTCTCAAGCTGTATCAGACTGAGT
 CCCCAGCACCGTGTGAAAGTTGGGCAACCGGTGTACACCCACCCAGGGCTCTGGCAAGCACAGAGACAAGAGGATCCTTGA
 GGCTGCTGGCGGCGCAACCTTGCCTAATCTGTGATTCCCATGTAGTGAGCCATAAGGTGGAGATGGGTTTGGGAAGATACCCACA
 TAGGCTCTGGGCGGCGCACACCCGGAATAAAAAAGCCAGGCTTGTATCCAGTTATTGGGGAGCTGAGGAGGAGGATCAC
 AGATTTAAGACTGCCAGGTTGAAGAGTAAGTTCAAGGGCAGCTGGACATCTGCTAGATTGTTTTTGTGTTGGTGGTGGTTT
 60 TTGTTTTGTTCTTTTTTCGAGACAGGTTTTCTCTGTGAGCCCTGGCTGTCTCTGGAACCTACTCTGTTGACCAAGCTGGCTCGA
 ACTCAGAAATCCGCTGCTTTCCTCCGAGTGTAGGATTAAGGTGTGCGCCACCATGCCAGGCTTAGATGTTTTAAATGAAG
 GGCTGTGGAGTGTGGTTACCGGTAGCTCGCTCAGACAGGCTGGGCGAGAGAAATGGATGGCTCAGATTGGCTGTGCTTACG
 GGTTCCTATTGTGTGAACAGACACCATGACCTGGCAGCTCTCTGAAGGACATTGGACTGGGCTGGCTTACAGGTTTATCAAGG
 CAGGAAGCAAGACAGGCTGTGTCAGGAGGGCTCAAGTCTACGACCGGGCTCTCAAGCCACCCCAAGTGAACAGACTTTC
 65 TCCAACAAGGCCACCCACTCCATCAAGGCCACACCTCTAGTAGTGCCACTCTTGAAGCCAGCTTATTCAAACCCCAATCAC
 AACTGCTTTTCTAGAGGACCCAGGTTCAATCCGACATCCACATGACAGCTTACAATTGTAACATAAATCCAGGGGATCCAACA
 CCCTTACACAGGCACACTTACAGAAAAGCACAATCAGTGACATAAAAAATACATAAATCGTTAGAGAGAGAGACATTAGCTA
 CCTTACCCCTTAACAGGCAAGCTGAGGTCTGGGAGTGTGTTAGAGGTCCGAGCTTGGAGTCTATAGGTTAGTGGCATGCTCTAT
 AGGTTCTCTTCTGACAGGTAGTACTTAGCTGAGACTCTGGGGTATCCAGAGACCCATTTCACAGAGGAGGCTGAGGCGG
 70 AGGGAAGAGACAACCTTGTGTTGCTGCTCAGAAGAGTGGCAGTGGGTATCCACCCACAAGGCTCAGCATCCGAGGCACTGTGGA
 GGAGTTACAAAGCGCATTGATTGGCTGTGATGACGAAATGAAGAGCCCGCGTGTGATTGGCGGTCCGAGGGAAGGAGCATG
 CAATGACATGGAGAGACAGATGAATCTTCCAGTTGAATCTCAGGCTCTGGTGGGCGCGCTGGGAGAGAAAGACACCTGTCT
 CGTTACACCAAGCGCAGCCAGGCTACGTGATGACTGGGGGAAGTCCAGAGCTGACTTCTGAGCACTGGAGGGAGGGGT
 75 CGAGGAGGAGGCTGAGAGTCTGTTGGAGGAGCCAGGAGTGGAGGGAAGGACAGGCTTACATGGAGGACATAAGTCTGG
 TGGAGTCCAGGGAGGAGGAGTGTAGGTTGATGGGAAGAAAGACCTAATCCAGAAAAGGAACAGAGGACCTACCTGGTT

201

75 HUMAN SEQUENCE - GENOMIC
TTGCTATTTGAAGTACCATGACTGCAAGAGGGGAGTTCCCGAAGGGGTCTGGGAATGGCCAGGGAAATAGGGGTGAGGTGAGACTC
TACTGCCGCCAGCTGAGCCCATGTATGAATTAGAAAAAGTGGGCCAGGCGTGGTGGCTCACACCTGTATATCCAGCATTTTGGGAGG

203

ACTCCGTCTCAAAAAAAAAAAAAAAAAATTAGCCGGCGTGGTGGCGGCGCTGTAGTCCAGCTACTCGGGAGGCTGAGGTAGGA
GAATGGCGTGAACCCGGAGGCGGAGCTTGCACTGAGCCGAGATCGCGCACTGCACTAAAGCCTGGGCAACAGAGCGAGACTCTA
TCTCAAAAAAAAAAAAAAAAAATTAGCCGGGCGATGGTGGTGCATGTCTGTACCCCGAGCAATTTGGGAAGCTGAGGTGGGAGGATT
5 GCTTAAGCCCGAGGAGTTTGGAGCGGAGTGAGCTGTGATGGCACCCTGCACTCCAGCTTGGGTGACAGAGTGAGACCCCGTCTCT
CCCTATCCCCCGCAAAAAAAAAAAACAACCTCAGGGCTTTCCCAACCCCTGTCTTGCACAGATGAAGAACCAGAGCTTCTAGAAGG
GGTATATTTTGCCCCCAGGCCCAAACTCTGGTCTTTGGACTACAGTCAAGACCTAGCACAGGGCTCAGGCCATAAAAAAGCTGT
TGAGGAGGGTGTGAGGCTGCAACGTTGCGGTGAGAGGGGGTCCCGAGGAGGGCGCAGCAGGAAGCCCCAGGGAAGTGCCTGGGA
GAGGAGGTTGTGCGCAGCCAGAAGGAGCAGCCCGCAGCTTTGGTGTGTAGTCTGTCTTGTAAAGTGGCAGTCTGGTTGGGTAGGA
10 CAGGGTCCGAGTCTCTCACTCAGGGAACTGAGTCCAGGGTGTGAGTGTGAGCAGCCCTTCTGGTGGCCTCACTTTCCCTGCGAGAGCT
GCTGCATGGTGTCCAGTGGCCAGCTGGGAGGAGCTCAGGACTGGCCTCACCTCGTGCCACGCCCTCGTACCAAGGTGGCTCAGAT
GGCAGCTGGGTTCCCGAAGGGCCAGGAACACAGCGTCCATGTCCCCATCCTTCCCGGAGGAGCTGGGGTGGGGCTCAGGAA
GGATCATGTGACTTGTTCAGGGCAGCTTGTCTGCCCCGACACAGAGGTGCCCATCGTAAGCGAGATGCGAGCAAGGTGAGGAC
AGGGCATGGTGGCCAGCAGGAATGATTTTCGAAAAATGCTACTCTGTGGTGGGCGAGGTGGCTCACTCTGTAATCCAGTACTTT
15 GGGAGGCCAGGCGGGCAGATCATGAGGTGAGGAGTTCAAGACCAGCTGGCCCAACATGGTGAAACCCCTTCTCTCTGAAAAATAC
AAAAAATACCCGGGCGTGGTGGTGGATGCTGTAAATCCAGTACTCAGGAGGTGTAGGCGAGGAGATCGCTTGAACCCCTGGAGG
TGAAGTTGCAATGAGCCGAGATTGCACCACTGCACTCCGACCTGGGCGACAGAGAAAGACTCCGCTGAAAAACAACAAACAAA
ACCCGAGATTCTCTTTTCCCGCGTCCGAGCTCTATGGCCATCTGAGCTCGTGTCTGTCCACAAGGACACATTTCTCTGGCAGC
CTGTGGACAGGGCTCACTCACTCACATCTGTACCAATCTAGAGCAGGACAAACACCTATCACCTGCACTGGCAATGGACAGAGG
ACAGTGGCAGCCCCATCACAGAGGCACTTCAAGCCAGGCACTTTCTATCGTCTATTATCTATCTATCTATCTATCTATCTATCT
20 ATCTATCTATCTATCTAGATGAGATCTTGTCTGTTGCCAGGTGAACTCCTGGCCTCAAGCGATCCTCTCTCAGCCTCCCA
AAGTGTGGGATTTCAAGTGTGAACCACTGTACCTGGCTGGAGTGCAGTGGCACTGTATAGCTCACTGCAGCCTCCACCTCTGG
GCTCAAGGAATCTCTTCTCTCAGCTCTCTGAGTAGCTGGGACACAGGCACTGACCATCACACCCAGCTAAACCTTGATTTTTTC
CATAGTATATGGCTCAGGGCAGAGCAAGAAGCACAAAAACATGTTGGCTTGGCTTGGAGGCTGATGGGAGGGGTTCTGGCCAA
AGCCCAAAATTAACAGCCACAACGTCAGTGTCTGTGGGAGGGGTGGCCAGGGGCGTGGGGTTCTGGGGCTCAAGGCCCTGCGGGT
25 AAACCCATTGAAGCAGGATGGCAAGAGGTGACACCATCTCCCCCGCGCACTGAAAGCCCTGGCTGGGATGCTCTGGGGCAGA
CACAGGCTCGGACAGCCCGCAGCAATCCAGTTTATCAGCGAGCGGCTGAGGGCCCGAGTTATCTAGTCCCGGCTGAGACC
TTGTGGGCACTCTGGTGTCTGCTGCACTTCCAGGGGCTTTTGGCATGTGGGGAATGTCCAGGAAAGCTCAGCCTTGGTGAG
GCGCAGAAAAGGGAAGTGTCCCTAGAGGGGTGGGTGAGGGCGTGGGAGGTGGTGTCTGCGAGGAATGTCCCTTTGGGGAGGAG
GATGGAGGGTGGGATTCTGAGGATGGGGGGGGGCTGTAGCCAGCACCATGTCCCTCTGTGTGACAGCTCAGAGTCCCATGA
30 AATTGGGGCTTGGAGGGGAAGGGACATGGCCCTGGGAACACAGAGACTGGGCTGGTCTGGCTCAAGTTGTGGATCTGTGAT
CCGTGTCAAAAAACGAGAACCAATCTCTGTCTGCCACTCACACCAGGTGGGACCTGAACCTTGGCATCGCCAGCAATTGGGA
ATGTCCGCACTGACTCAACCACTCTCCCGAGACCTATTTGGGCCACCCAGGCGGGTGCCTGGGCCACACGGAGGGGTCTGGT
GGTCTTCAGGCGAGCGGCTGTGGGGCTGAAGCCTCAAGGAACCAACATCTCTGCAATAGGAGGGCAGGCTGACGGGCTCGGAGACA
ACCTAGTTGGGCGTGTGGGGTCTGTGGGTCCAGGTCTGGCCTCACCGGTCGCCACCGCGTGTGAGTCCAGCCTCTTTCC
35 CTGCTGCGCTCTGGGCTTCTGTAAGGCTATGTGCTCAAAGGCCACTCTCCAGGCGAGCCCTCAGAGCCCCCTTCGCCCCAGTA
CCGATCTGACCGTGTCTCTGTAAGTCTCTGAGTCTCCATCGTGACCTCAAACTCTGCTCTGCTCTCTAGCGAGGCTTGGGGT
TCCGAGGTGGGGACATCCGGGGGGTTAGGTGGCTGGCGCGGGGAGCGGGGTGTGAGGGGTGATGTCTCAGGCGGCGGCT
GCGGGGTGCGGCGAGGACACCGGTGGGGTGTAGAGCACCAGCGGGGCGAGCAGCGGGGCGGAGCGCGGGTCCCTCGGCCGGGG
40 CCTCCCGCGGAGCCAGGGCGGGACAGGGGGTGGCTGGCTGGTGGCTGACGTCACTCGCTCACTCGCTTCAAAATGTGGGGCGCC
CGTAGCTGGGCTTTGTGGAGCGCTGCGGAGGGTGGCTGCGGGCGCGGCGAGCCGAACAAAGGAGCAGGGGCGCGCGCAGGGACC
CGCCACCCACCTCCCGGGGCGCGCAGCGGCTCTGCTCTACTGCCACCATGACCGCCACAGGCGAGCCGAGGCGGTGCGATCC
AGTTCGGCTCATCACTGCGGCAACAAGTACCTGACGGCCGAGGCGTTGGGTTCAAGGTGAACGCGTCCGCGAGCAGCTGAAG
AAGAAGCAGATCTGGAGCTGTGAGCAGCCCCCTGACGAGGCGGCGAGCGCGGCGTGTGCTGCGCAGCAGCTGGGCGCTGACT
45 GCGGCGGACAGGAGCGCAACGTGACCTGCGAGCGGAGGTGCCCGTCCGACTGCGGTTTCTCATGTTGCGCAGCAGCAGC
GTGCTGGTGTGCTGAGTCCGAGGCGCACCGGCGCTACTTCGGCGGCGACAGGAGCGGCTGTCTGCTTCCGCGCAGAGGTGTCC
CCCGCCGAGAGTGGAGCGTGACATCGCCATGCAACCTCAGGTCAACATCTACAGCGTCAACCGTAAGCGCTACGCGCACTGAG
CGCGCGGCGGCGGACGAGATCGCGTGGACCGCAGCTGCCCTGGGGCGTCACTCGCTCATCACCTCGCTTCCAGGACGAGC
GCTACGCGTGCAGACCGCGGACCGCTTCTGCGCCACGACGGGCGCTGGTGGCGCGCCCCGAGCCGGCCACTGGGTACAGC
50 CTGAGATTCCGCTCCGGAAGGTGGCTTCCGCGACTGCGAGGCGGCTTACTTGGCGCGCTCGGGGCCAGCGCTCAAGGCG
GGGCAAGGCCACCAAGGTGGGCAAGGACGAGCTCTTGTCTGTGAGCAGAGCTGCGCCAGGTCTGTGCTGAGGCGGCGCAACGAGA
GGAACGTGTCCAGCGCGCAGGGTGTGAGTGGGAGCGCTGCCCGGCTCTCTGCTGCGTGCACAAAGCGACCCCGCGGCGCT
CCAGCCTCCCGCTTCTCTGCTGCGGCGCGCTGCGGTGCGGAGCACTGCCATTGCGGCCCGCTAGGCGAGGCGGCTACCC
65 CACTGGAGGGGGCGAGGAGTGGGGCTTTGCCATCTCGGGTGGCGTGGCCACCTCCACCCCGGGCTGGGATCATGGGCTCCCC
TAGGCCCCGCGAGTTCGCAACCGTACGTGACCTCTTAACCCCGCCCCCGCCAATCTTGGCTCTCCCGCAGCGCGTATCCC
TGGGGTCCGAGGCAAGGGTCCGCCACCGCAAGGGCGGCTCCACCCCGCAGGCGCTTTCCGGGCGAGATGGGGAGGTTAG
CCAGGCTTTGATCCCGCGGGGCGCGCTCCACCTCCCGTCTGCGCGGCTTCTCCACCTCTCCCGCTGCGGGGCGGGTGG
70 GCCTCCGCTGGTGGGGGGGGCGGGGTGTGAGCCTTCCCCCAGCCCTCTCCCGCTGCGCCGCGCTCGCCCGCGCTCGGCG
CTTTGTGAGCAGGGGGGCGGGTCCGCTCGACTGGGTCTCTCTCGCCCCCTTGTCTCTGCTCCATCTCTGAGATGGGAAACAG
ATGCGGCGGGGCGGGGAGGGATCGGCTTTTGGGTTACCCCTGACAGGAGGCCCCCGCGCGCCCCCGGGCCAGGGCTCGG
GTCGCGAGGTTCCCGAGGCGGCTCTCTCTCGCGCGCGGCGCGGGAACGGCGTGGCGGATGGCGGCGCTCCAGGCAACCC
CGCCCTTCGCGCGCGCGCGCGCTCTCCAGGCGGCTGCGTGAAGTCCGCTCCGCGGGCGACCGAGGCGGCTTACGCGGAGCCG
GAGACCCAGGCGAGCTCCCTCGGAAGCCCTACCTCTGGTGAACCATCCCTAGGGCGCTCGCGGGAACAAATTGACTGCAA
CTCGATCCGCTCCCTCCGGGGCTCTGCGAGGACGCTATTTGCGACCGGCTGTGCGCACTCTTTCCCTTCTTCTCAGATT
75 TCCCGAGGGGCTTCTCTCTTTTGGCGTCTCTTCCACTCTGGCGGAGAACTGTTCTTGTCTGAGACAGAGGCGCCGCT
GGAGGGAGGGGCGTGGGGGATCTTTTCCCTGGATAGGAAGTGGACCCAGGCTTGGAGATGGCTGGACGGGAGCCAGTTT
TGTCTCATCCCTCTCTTGGAGGAGCCCTCTGACGGCCCCCTTGTGCTGTGGGCTGTGAGGAGGGGAAAGACCCCGCT
GGCAGTGGGGTGTGAGGTGGAGGCTGGGTGGGGTAAATGGCAATTTGTGCTGAAGTTGTACTTAAGTCCGAGAGAGGAA
GCTGCTGTGATGGGTACACAGCAAGTGACCAAGGAAGCAGCATGCAGAGTGGGTGCAATTTGGCTCCAGAAACCCGTTTCC
70 TGTTCCTCCACAGCGCATGGCGGCGAGCTCTCACCTGATCAGCAGGCAATTGAGCCCTACTAAGGGGACCTGTGAGCCATGAGT
GAACAGTGGGGTTCAGGTTCTCTTGGGACATTACGAAGTGTCAAGGAAAGGCGAGCGGTACAGGTTATTAGATGGCTGAGTCC
TTTCTGAGCAGGACATTGAGCTGGCTGAAGGATGAATAGAAGTGGCAGGTATGGGGGGGTGTGCTGTGAGCAGCTGTAG
GCTGTGGGTGTCTCTGTGCAAGGTCTTATGGCAGGAAGTACAGAGAAAGCCAGTGTGGCTGGGAGGAAGCTGTGAGGTCTG
GGCCACGGGACCTTGGGTGAGAGCTTAGTGACGGCTATGGTCTTGCCTTGGGGTTCAGGCCACAGCCTCCCGTGGGAAGAGT
75 CGCAGAAAGTAGGTGGCCTTGGCCCTGGGGGCCAGGAAGTTGACAGAGCCTGAGGGTGTTTTGGCGAGCTGGGCGAGATAACTCC

CCTCTCCTGAGAAGCTTGCTGGGGCGTCTGGTGTGTGATTGAGGCTGATAGGGTGGGAGGAACAGAAATGACGCCAGGAGAGG
 TGGTGGTGTATGGCTCAGCTTGGAGTTGAAAGGGATGTGGGACGGCGGGGGTGGGGTACTTGGGGGCGGAGGTGGGGCTCCTC
 TGGCCTCAGATCTTGGGGTCTTATCTCGTTTCTATGTCAGCCTCACTCCCGGGGGGCTTTTGGGAACCTGGAGTCTGCAGGGGTGGG
 CGTGGGGGGCGTGTCTGCAGAGGCCATTTTGGACGGGCTTGGTGGCAAGGGGGAGGCGTCTGCTTCCGACACACATGCTGGGGAA
 5 CGCCAGCCAGGAAGGGGAGGATCCGACCTTAGCTGGCAGGGGGATGTGAATCATCTCTGCAGGCTGCACGGGCGGGCCCGTGG
 GGGCAGGGTGTCCCCCTTGAAACACGCTGCGCCCTGCTCTTTCAGCCTCAGTTTCCCCATCTGTAAAGTGTGCATTCAGGCTCC
 TTGGGCTGGCCAGAGCTGCCCTGGGCGAGGGCTTTCAGCCCTTACACCCAGAGGCTGGGTGAGTGTGCTCTCTTTGCTC
 TCCCGCATGCCCCAGGCTCCTCCTGCTCCCCAGGATCCACACCTACCTGGCCCCGACCCTGGGCCATGCCTCACCACACTTCC
 TGTCTTCTCTCACATCTCTCACATCTGGAGTCTCTCCCCGCGAGCTGTGCTTGATCTGGGGATCCATGCCAGGGATAGGACCT
 10 GTCTCTCCTGCTGGCTTGGGACATGCCCTCTCCAGCCACTCTGAGGAGGGCTGACTGAGGAAGGGCTCGTCAAGCTGGGCTTTGC
 AGGATGTGTAAAGATTCTCCCCAGAGGCGCAGGGCATTTCTGAGCCAGGGAATGGCTTGTATAAGGATGCAGAGGCTTTGAAAT
 GGCCAAAGTAGTTGCAGGAATCGACTGGAAACCGGGGTGGTAAAGTGAAGCCATAGAACATTCAGGCCCCCTCCCTAAATGAGAT
 GGAAGGAGTGCCTGTTTGAACAGCCAGGGGATCTGGGACCGTTAAGGCTGGGGTGGTGTATGGGACTGGAGGGTGTGAGG
 CAACAGGGGGTGGCCCTCTGAGCCACACAGACAGATGGTTTCAAGAGGCCAGGCACACTGGCTCTCGCTGTAACTCCAAGCACT
 15 TTGGGAGGCCAAGGAGGAAGATGGCTTCGGCCAAGGAGGAAGATGGCTTCAGCCAGGAGTTCAAGGCCAGCTGGAACCATG
 GGAAACCTCTGTCTACAAAAAATCAAAAAATTAGCCAGGATGGTGTATGCACGCTGTCTGCTCCAGCTACTCAGGAGGCTTAGA
 TGGGAGGATCATTTAGCCCGGGAGTTTGGGCTGCAGTGCAGGAGATCGTGCCACTGCACCTCAGCTCCAGCTGGGCAACAGAGA
 CCCTGTCTTAAAAAATTTTTTTTGGGCTGGTGGTGGCTCAGCCCTGTAATGCCAGCACTTTGGGAGTCCAAGGTGGTGGATC
 20 ACCTGGAGGTGGGAGTTTGGAGCAGTCTGACCAACATGGAGAAACCCATCTCTACTAAAAACAAAAAATAGCCGGGCGTGG
 GATCGCACCATTGCACCTCCAGCTGGGCAACAGAGTGAACCTCATCTCAAAAAACAAAAACAAAAACAAAAACAAAAACA
 AACAAACAAAAAATGTAATTAATAATTAATAAGAAAAAAGTTAAAAAAGAGAGGATGGCTCAAGGCTGGAAACAG
 CGAAGGCGACTGTGAGGGGAGGACAGGCGGGCTAGACTCTCTGGAAGGAGGAGGAGAGGTACCCCTGGGCGCGCAGGAGA
 25 GTTCTTAATCTCTGGCTCCCGGGGCTTCTGTGGGCTGTGAGCTCAGGATTTCTGTGCTCTGTGTGATGAAAGAAAAATCTTGAA
 GAAACACTGTTCCCATAGTAACACAGCTCTAATTAGAGACTCAAGGCCAAGCGAGGGGCTTGGAGCCAGGAGGGGCTGTCT
 ACTGGGGGAGCAGACCCCTTCCCTATCCCTCCTGCTGGGCTGTGGCTGTATGCTACGTGGCAGGCGCCCTAAATCTCTT
 CAACATCTCGGCGAGCGGAGAGGCTGGGCGCTTTGACAGGTGGGGAACCTGAGGAAGGTTCAGGGAAGGCTATCCAAAGG
 TGCTGGCCCCCGCGGTGGGTGCTCACTGGCTGGCTTAAACCTTTGATCAACAGGTTCCAGGATTTGAACGCAACAGGCTGAT
 30 GGGGACTGAGTCTGGTACAGATGGCGGAGTTGTGTGGCCCTGGGCGCAGGAATGGCTGGGAAGCTCCCTTTCTCTCTGGCTTG
 GGGATGAGGTTAGTGTAAATTTCTGAGGATTCAGGAGGATTAAGGCCGAGCTGCATTACACGTCGAGGCTGGGCTAGGCGCA
 GTTAAGCCCTGCGCAGCCATTGGAAGTCTCATTGAGAAGGAGCTCCCGCTTCTGCTATTTGTTCCAGGCGGGCTGGTAAGGCGC
 CTGCTTATTTGCAAGGCTGTGTGAGGACGAGCCCTGTAAACCTTAGGACGAGGCTGTGCTAATGTGGTTTCTGTTCCACTGTCTC
 35 CTTCTCCTTTTGGCCCTCTTTCTGGGGAACCTGGAGCCCTGATGCCCTCTGTTTCTCTGCTGCTGGGCTGAGCTTACGACCT
 CTCCCTCCATCTTTCTGCTGCTGGGCTGGGCTGCAGGAGGCTGTCTCTTACCTGGTCCCTAACTTCCCTCCGATCAGCGGGG
 TTCAGCGGAGCCCCAGCGCATTTGACAGGTTGGTGTCTGTGGCGGCACAGGCCAGGGCCAGGGTGGCGGCCCTGCTGTAGGTA
 GACATGCGGAGCCCTCTGAGCAGAAATGAGGGGCGGTGAGGCGAGCTGTGCGGGTGTGGCTGGCCTGACGGCTCCCTGAGCCCTG
 CGGCTTCTGTGCTGAGTGGGGTGGGGCGGGCCAGACCTTTGACAGGCGCTTGTGGCTGGTGGAGGGCTGAGTGAGCAGAGGCCAGC
 40 CCTCGTGTCTCCCTGGGGTGTGGCCTTAGGATGGTCCCGGCACCTGGGGACCCAGCCCTGCTCACCTTATCTCTCTCCGCTGCT
 GGCTGGGGTGTGGTGGCTGAGCCAGCCACCCAGTGGGATGCTCGTGGAGGGCAGAGGGTGGGCTACCGGCTTAAAGGCTTAA
 CCAGGGAACCTGGGGGTGGAGCCCAAGGGGTTCCAAGAGGGGCGGGGCCAGGAACCCATAGACAAGAGGGTGGGGCAGGGAAG
 GCGTGGCAAGAGGGGCCACCCACCTCCCGTCCAGAGAGCCAGCCAGACCTTACTTCTCTGTGTGTGACCTTAGGCAAGGACA
 TGCCACCACCGGCTTAGTCTCCCTCTTTGTGAAGTAGGATGAAGATCCACCTGTGGAGCAGATGTGGGGCTGCATGGTTGGGT
 45 CAGGATGGAACAGGATGGGGAGGCCCGGCTGGTGTCTTACCCTGTAATCCAGCACTTTGGGAGGCCAAGGTGGGAGGATGCT
 TGAGTCTCGAGTTTGGGCAACATAGCGAGACACCCCATCTCTACAAATATGTTAAAGTTAGCCAGGTGTAGTGGTGTAGTGC
 CTGTGGTCCACCTACTGGGAGACTGAGGCAAGAGGATCCTTTGAGCCAGGAGGTGGAGGCTGTAGAGGCCATGTCTGGGCCA
 CTTGCACTCAGCCTGGGCAACAGAGCAAGACCCCTATCTTCAAAAAAATGGAATGAGGATGTGCTCTCTGGGTGGGCTTACG
 50 ACCACCCAGCAGCTCCTCTCTGTGGGTGTGCTGCCACCCAGCTGAGGTCTCTGAGCATCAAGGTGCCAAACGAAGAC
 ACTCTCCAGCTCTGAGCCAGGACCCATACAGAGCCCGGAGAGGCTCTGCTGCTGAGTCTTAGAATCCAGAGCGGTGGGGA
 ATGTGAATTTGTGCTGCTGGAGCCAAACATCCACCTCCAGGTTTGTAGTGGAGGAATCCATGTGGAATGCAAGCAATGTAGTT
 ATAATGAATAGCAATTGTGGGCTGGGCGCAGTGGCTCATACCTGTAATCCAGCACTTTGGGAGGCTGAGGTGGGTGGATCACCTG
 AGGTGAGGAGTTTGTAGACCGGCTGGCCAAACATAATGAACTCCGCTCTACTAAAAATACAAAAAATTAGCCGGGCATAGTGGC
 55 GGGTGCCTGTATCCAGCTACTCAGGAGGCTGAGGCGAGGATCACTTGAACCCAGGAGGAGAGGTTTCAGTGGGAGGCTGAGG
 GTGCCATTGCACTCCAGCCCGGAGACACAGCGAGACTCTTTCTCAAAAAAAGATAGCAGCTTTGCTATAGCTTAGGGGAGCA
 AAACCCGAAAGCCACTTAAGTTTCCGAAGATAGAGATCCCTGGGGTCTTATCTGAGACAGAGTCTGTCTGTGCGCCAGGCT
 GGAGTGCAGTGGCGGATCTCAGCTCACTGCAGCCTCCGCTTCAAGCAATCTCTGCGTCAAGCTCCGAGCAGCTGG
 60 GATTACAGGCGCCCGGACCCACCCAGCTAATTTTTTTTTTTTGGAGCAGAGTCTCGCATTTGTCGCCAGGCTGGAGTGCAGTG
 GCGCATCTTGGCTCACTGCAAGCTCCACCTCCCGGTTTACGCCATTCTCTGCTCAGCTCCCGAGTAGCAGGACTACAGGC
 GCCCGCCACCGTGCCCGGCTAATTTTTTTTTTTTGTATTATTAATAGAGACGGGTTTACCGTGTAGGATGATCTCGATCTCCTG
 65 ACCTCGTATCCGCTGCTCGGCTCCCAAAGTGTGGGATACAGGCATGAGCCACCTTGGCTGGCTTTTTTTTTTTTGTATTTTT
 AGTAGAGATGAGGTTTACCATTGTGGCCAGGCTGGTCTCAAACTCTGACCTCATGATCCGCCCCGCTCGGCTCCCAAAGTGT
 GGGATTACAGGTGTGGGCCACTGTGCCCGGCGAGTCCCATTTCTACTTTTAGGGACATGGAATCATGTAAAGATGCCATACAGAAA
 ACAGTGTGCAATCCAGAGACAGAGGACATCTGTGATGTTTCTTTCTTTCTCTTTTCTTTTCTTTTGTAGATGGA
 TTCTGTCTGTGCGCCAGGCTGGAGTGCAGTGGTCAATCTCAGCTCACTGCAACCTCTGCTCCAGGTTCAAGTATTCTCT
 70 GCCTCAGACTTCAAGTAGCTGGGATTACAGGCATGCCCCACCATGCCAGCTAATTTTTGTATTTTGTAGTAGAGGCGGGTTTCA
 CATTGTGGCAAGGCTGGTCTTGAACCTCATGACCTCAGGTGATCCACCCGCTCAGCTTCCAAAGTGTGGGATTACAGGCTGA
 GCCGCGTGGCAACCCGATGCTTCTTATGTATAAGAAAAAAGCAGTAGAAAGTTGTGGGTTCACTGGCTGGGCACATGGTGGCT
 TGTGTCTGTAACTCAGCACTTTGGGAGGCTGAGTTAGGAGGATCATGTAGGCGGGGAGTTCAAGACCATCTAGGCAACATAGC
 CAGACCTGTCTGTACCAATAGAAAAAATTAACCTTGTATGTTGGTGGTGTGCTGCTGAGTCTCAGCTAATTGGGAGGCTGAGG
 TGGGAGGATCACTTGAAGCCAGGAAGTCCAGGCTACAGTGTGATGTTGTGCCACTGCACCTCCAACCTGGGCAACAGAGCAAGA
 75 CCCTGAATCAAAAGAAAGAGATGTATTGCAACACAGGGGTGTTCTGAGTGGGGTGGGAAGGGGAGCTGTAGGACTTCATAGT
 TTCTTTTTTTTTTTTGTAGAGACAGGGTTAAAAAATTTTTTTTTTTTTTGGGCGGAATTTCTTTGTGTCACCGGCT
 GGAGTGTCTGGCTCACTGCCATCTCCGCTCCAGGTTGAAGTGTATCTCTGCTCAGCCTCAGGCAATTTGTATTTTAGT
 AGAGACGGGGTACTCCATGTTGGTCAAGCTGGTCTCAAACTCCCGACCTCGGGTGTCTGCTGCTTGGCTCCCAAAGTGTCTG
 GGATTACAGGTGTGAGCCACTGTGCTGGCCCTTTTTTTTTTTTAAAGTAGGCTTGTCAAGTGTCCAGGCTGGTCTGAAC
 TCCTGGTCTCAATGATCTCTGACTTGGCTCCCAAAGGCTGGGATTGCAAGGATATGAGCCAGCCGACCCGCTTTTAT

AAGTTTTCTAAAGGAAAGGAACATGTACCATCGTGTATTTATTTTAAATTTTACATAGAAGCAGGAACAATAGCATGAACCCCCAGA
 CACGGCCCCCAAGATGCGCTGTTCCGCTGTGCTGCAGCCCCATTGTCTTTCTATACCATTTTGGTGTATTGAAGCAAAAT
 CCCTGACATCAGGGCATTTCATCCCAAAATACCTTCCATCTGTGTTTCTAAAAAAGCAGGGCCATTTTCTATGTAAACCAACCGTG
 ATCAACAGTAATCAATGCTTAAACATCTAATCTCGGGCCACGTTAAGACCCTCTGATTGGCTCAAGAAATGCTCTTTGTGCAAGTGG
 5 TTTCTTGATTCTTTTGTTTTTTTTGTAGACAGGGTCTCACTGTGTACCCAGGCTGGAGTGCAGTGGTGAATCAGGGCTCACTGC
 AGCCTCAGCCTCCTGCTCAGCGATCTCTGCTCAGCCTCCCAAGTAGCTGGGACCACAGGTTTGACACCACCTCCAGCTAA
 TTAATAAAGTAATTTGTAGAGACGGGGTGGGGTGGGGTCTTGCTATGTTGCCAGGCTGGTCTCAAACTCTAGACTCAACCA
 ATCCTCTGCTTGGCTTGGCTCCCAAGTGTGCGATCAGGCGATGAGCCCTGTCTGCTGGCCCTATTATTCTCTAAGTGGGAAA
 10 GTCATGTGGGAACAGATGTAGCTTGCTTGGCTCTGACCGGCCCTGCTGCGTTCTCTGGTGTCTCTGCTGCTCTCATGTGTG
 CCATGTGGGACTCGGCCGCCACCCACCCGTTGGTGTACCTTGGTGTGTAGTTCTGTGAGCTCAGGCTATGGTCTGCCAG
 AACTAGGGGGCGTGGGGCCAGTACCAGCCCAAGGCTCTCTCTGAGGTATGGACCTGTCTGCCAATCAGGACGAGGAGACCG
 ACCAGGAGACCTTCAGCTGGAGATCGACCGGACACCAAAAGTGTGCTTCCGTACCCACAGGGCAAGTACTGGACGCTGAGC
 GCCACCGGGGGCGTGAGTCCACCGCTCCAGCAAGTGTGCTGCTCCACCTGTACCCGCCCCACACCTTGCTGGGCTA
 15 CCGCGCTGACCTGTCTCCGCGCATCCCCAGGAATGCCAGTGTACTTTGACATCGAGTGGCGTGACCGCGCATCACACTGAGG
 GCGTCAATGGCAAGTTTGTGACCTCCAAGAAGATGGGAGCTGGCCGCTCGGTGGAGACAGCAGGTAACTAAAGCCCCAGT
 TCCCTGGAGCGCTCTGGAGTCTGGAGGGTCTGGCCATGCGTGGTCACTTGGTAGCCCCAGCCAGGCTGTCTGTGTGGGC
 ATCCCCCGGAGTGGCCCGCACTGTCTTACCTCTGGGCTGACTGTGTGACCCAGCTCTGGCCCTCTCTGTGCTACCC
 CAGCCTCCACCCACTCCTGCGCAGGAGGCTCACTGACTCCCTCTTTCTGGGACAGGGGACTCAGAGCTCTCTCATGAAGCTC
 20 ATCAACCGCCCATCATCTGTTCGCGGGGAGCATGGCTTCACTGCTGCGGCAAGGTACGGGACCCCTGGAGCGCAACCGCTC
 CAGCTATGACGTCTTCAGCTGGAGTTCAACGATGGCGCTCAACATCAAAGGCAGGTTCTCTGTGGGCACTGTGGGCAAGG
 AACCCCTCGTGGGGTGGGGTCACTGTGCTGGGGGAGCGCCCTCTGCATCCACACTGGACCCTGGCTGGCTCAGGGCCATTCCA
 GGCCCTAAAGGACAGGTGTCTGATGGCCACAGGGGCTCTGGGATGCAAGCAGCCCTTCCCTCTGTCTGTGTGGTGGGGG
 ACTTACCTTGCCACCTGACAGAGAGGTGTGTGGAGGGAGAGCAGGAGGGGAAGGAGAGCAGGGAAGGGAGAGAGCAG
 25 GGGAGGGGAGCGGGGAAGGAGAGGAGAGCAGGGGTTGGGAGGTTCTGGAAAGGGTGTGACGGGAGGAGCGCCCTCGGTATAG
 GACTGGAGCCCTTCCAGGAGGAGCCCAACATCCAGAGGTGCTGTAGGATTGAGAACATGTTTTTTGTGTTTTTTTGTG
 AGACTCACTCCTCCCTGGCTGGAGTGCAGTGGGCTATCTCGGCTCACTGCAACCTCTGCTCTGGGTTCAAGTGAATCTCC
 TGCTCAGCCTCCCAAGTAGCTGGGATTAAGGTTGTCACAGCAGCCTGGCTAATTTTATATTTTATATTTTATATTTAT
 TATTTGTAGACCCAGTCTGGAGTGCAGTGGGTTATCTCGGCTCTCTGCAACCTCTGCTCTGGGTTCAAGCGATTCTCTGCTC
 30 CAGCCTCCCGAGTAGCTGGGACTATGTGTGGGAGCCACATGCTGGCTAATTTTGTATTTTTCATAGAGACGGGTTTCAACA
 TGTGTCCAGGCTGGTCTTGAATTCGTGGCTCAAGTATCCGCCACCTCAGCCTCCACAGTGTGGGTTTATAGGTGTGAGGCT
 ACCACACCCGGCTAATTTGTATTTTGTATTTTGTAGTAGAGACGGAGCTTCACTATGTTGGCAAGGCTGGCTCGAATCTCTGACCTCAAG
 TGATCCGCCACCTCAGCCTCCCAAAGTGTGGGATTACAGGCGTGAGCCACTGCGGCGAGCAGAACAGTCTTAGGACCTTGT
 TCATGTGCCATCATGGACAGGAGGACGTGCGGGCCATAGGAGACCTGGCTCATTCCGAGCGGGACTGGAGGGTGGGGCGT
 35 CTTGGGAACACCCGTGCCACCTCCGCTGCCAGGAGTGGGGTGGGAGCCAGGCTTGGGCCCCACTTGATAAAGTCCCTCC
 CCAGACTCCACAGGCAAACTACTGGAGCGTGGGAGTACTCCGCGTCAACAGCAGCGGCGAAGTCTCTGTGAGCTTCTTCTCGA
 GTTCTGCGACTATAACAGGTGGCCATCAAGGTGGGGCGGCTACTCTGAAGGGCGAACACGAGGCGCTCGGCGCTCGGCG
 AAACCGTGGACCCCGCTCGCTCTGGGAGTACTAGGGCGGCGGCTCTTCCCGCCCTGCCACATGGCGGCTCTGCCAACCC
 TCCCTGCTAACCCTTCTCCGCGAGTGGGCTCAGGGCGGGAGGCAAGCCCTTGGCTTCAAACTGGGAAACCCAGAGAAAAC
 40 GGTGCCCCACCTGTGCGCCCTATGACTCCCACTCTCCCTCTCGCGGGTTCCTACTCCCTCAGGCTCAGCGGCTGGGCGCT
 GGCTCTGGGAGGATTTAGATGCCCCCTGCTTGTCTGCCACGGGCGAGTCTGGACCTCTTCTCTGACCTCAGACGGCT
 CTGAGCCTTATTTCTCTGGAAGCGCTAAGGGAGCGTTGGGGGCTGGGAGCCCTGGGCGTGTAGTGTAACTGGAATCTTTGCTC
 TCCACGCCACTCCTCCAGCCCCCAGGAGAGCTGGGCACATGTCCCAAGCCTGTCACTGGCCCTCCTGGTGCATGTCCCCGA
 45 AACCCCTGCTGGGAAGGGAAGCTGTGCGGTGGGCTAGGACTGACCTTGTGGTGTTTTTTTGGGTGGTGGGAACAGCCCT
 CTCCACAGTGGCAGAGGCTCAGCTGCTCTCCCTTCCCTGGAGCGGAGGCGTGACGGCCACAGGCTCTGCCGCTGCAGCTTCTG
 CCAAGTGGTGGTGGCGGGCGGGTAGGGGTGGGGGCGTCTTCTCTGTCTCTTCTCTTCACTAGCTGAGTGAAGCAG
 AAAATGACCAATCAGTATTTTATTAATAATATTTATGCTGAGGCGTCCAGGCAAGCCTGGCTGTAGTACGAGTGTATCTG
 50 GCGGGGGCGTCTCAGCACCTCCCAAGGGGTGCATCTCAGCCCCCTTCTCCGTCTCTCCGTCCAGCCCCAGCCTGGGCGT
 GGCTGCCGACCTGGGCGAGAGCCCTGTGTGTTGCTCCTGGGCTCCCGGTGGATGAAGCCAGGCGTGGCCCCCTCC
 GGGAGCCCTGGGGTGAAGCGCGCGGGGCCCTCTGCTGAGCCTCCCGCTCCCAACATGCACTCACTCTGGGTGTCTGGTCT
 TTTATTTTGTAGTGTATTGTATAACTCTAAACGCCATGATAGTACTTCAAACTGGAATAGCGAAATAAAATAACTCAG
 55 TCTGAGCCCGAGGCGGCTGTGTGTCTTGGGGCTGAGGTGGGTGGGGGGCTGAGGTGGGTGGGAGGGCTGGCGGGACAGT
 AGGCGCCCTGGCTCCCAAGCTCAGTGTCTGGAGTGTGACAGTGGAGGAGGCGTGGCTCCAGTGGGTCTCGGAGCTCTGGG
 CCAGCACCTCCTTAAGCGGGGATGGAGCGTGGGAGGGGTGGAGTGTGGCCATGCGACCCCCAGAGCCATTAGGAGGAGT
 CTGTGGTGAAGTGGCTGTGGCTCCTCGTAGGCTACGTCCACATGCGGGGAGCTCGGGGTGTCTGGCGGTGGCAGCTGGAT
 60 GTTGAGAAGGCGAGCCAGGAACTCAAAACAGGAGACCCACATTATCTCTAGTTGACATGTGCGCTTCAGTGGGAGT
 TGGTGTAGGGGCGAGCTCCGCCCCATACTGCGAGGATCCGGGCTTCACTTCCCCAGACACAGAGGTGGGGTGGCCCTGGG
 CTGGGAGATGTGCTTGGGCCCTCAGGGGGCGGCGGTGGTAGGATGGACGGGCGAGCGTGACAGCCCTGGGAGGCTCCCTAC
 ATCGGAACAGCAGCCCTGGGATATCTGGCATATCAGAGGCTGAGGACTGTTCCAGACTTTACCAAGGCCAGTCAAGGCGAC
 65 TTGGGTCTGAGCTCCCTTTGCATCTTAGCTGCGAGGACAGGGGCTGGGAGAGGCTCGCGAGCTCTGTCAGCTTCTTCACT
 CCCAGTGGCCCTAAGGATAGCAGCTGCGAGAAGTCTGAGGGGAGGAGCAGTAAGGCGCAGCCTGGAGCGGAGGAGCTGGCGTCC
 AGTCATTGTGCGTGGGAAGGCGGTGATGGCGACGGAATTTGGGACACGCGGGGCGTCCCGGGGCGAGCCAGGGCACTGCAGGCCG
 GAGCCCCCTGTTCCCGCGCATCTCCCGCGGTGCGGACAGAGCAAGCGCTGATTGGCTGCTGATGACGCAACTGGGAGGGCTGC
 GCTGTGATAGTGGTCCCTCGGGGCGTGGGGCGCAAGTCTTGAGATTGGCAGGGGCGAGTGGCTGTGACAGGGAAGTGGGGT
 70 CACTCAGCGAGTCCGGCGGCCACCCCTCTCCCTCCCCATGAAAGCCAGGCTGGAAGCCAGAAAAATCCAGTGAAGTGAAG
 AATTTGGCGCTACACGTTGGCGAGATTCCCGAGGCTGACGCAATGAGCAGCATAGTCCGATGGGGAGGCTGGAAGGGCGGT
 CACGAGATCTCTGGGAGGAATCGGTAGGAGCTGCCAAGTGAAGGGGACGGGGGCAATAACCGGGGCGAGGAGCTGCCAGGCC
 CTGCCCTCTGGGGGGAAGCCAGGCCAGGGGCGGGGGCATCTCTGGGTCCAGGTGAGATGCGGGTGGAGGAGCCAGGCCACGG
 75 TTCTCAGACTCGCGTGGAGGCCACGAGCGTCTCTGAGGAGCGGGCACTGCGCGGACCGGAGACTCTGGGCGCTCTGTCTCC
 CCATCTCTGACCTTTCTTACCTTCACTTCTCTCTGTGAGGACAGTCTGGGGCTCGCGGGGAGGAGCCAGGAGGAGG
 TGCAGTTTCCGCTCTGCTGAGTCACTCTGCTTCTCAGGATTCTTCACTTCAAGGGCGTGGGCCATCACAGCACTCACAC
 ACTTGTGAAGTTCACGCAACACACATATGAGCTGTGCAAGAGCCCCATGCAAGGAGGATACAGTGCATGTAGGCGTGCAC
 ACAGACACGACAGATGAGGACAGCAACTCCAGGAATCTGCTCCAGCCTACAGGAGTACAGCTCAGGGTACAGCCTCTG
 TCCCGTGACCCCCATTCCCGGAGTTCTCCAGGTGGGTGGGGGCCATAGGAGCCCATACCCGAGGGTGGCTCTCTCATT

207

5

10

30

45

55

MOUSE NOMENCLATURE

5	ICSGNM	Map3k6
	Celera	mCG20807

HUMAN NOMENCLATURE

10	HGNC Celera	MAP3K6 hCG19300
----	----------------	--------------------

MOUSE SEQUENCE - GENOMIC

[illegible]

210

211

AGATTTATTATTATTATTATGTATATGAGTACACTGTAGCTGTATAGATGGTTGTGAGCCTTCATGTGGTTGTTGGGAATTGAAT
TTAGGACCTCTGCTCTCTCTAGTCGGCCAGCTTGTCTCAGTCCCTGACTGCTCTGGCCCAAAGATTTATTATTATTATAAATAAG
TACATTGTAGCTGTCTTTCAGACACACAGAGAGGGGTGTAGATCTCATTAAAGGGTGGTTGTGAGCCACCATGTGGTTGCTGGGAA
5 TTGGACTCGGACCTTCGGAAGAGCAGTCAGTGTCTTACCCGATGAGCCATCTCACCAGCCCTTGAATTTAATGGTGA
ATGGAAGGAATCTGGCTGGAGACAGGTGACTGGATCCAGGAACCGCTGGTAAATCTATACTCAAGGTTGGGTAACTAGAGAA
AGACCTCAGCATCGAAAACGGATGCAAGGCCCGTGTGTGGGGGTGTGAGACGGGTTGGTAGAATTTGAAGGGAGGACGATGTAG
CGTCAGTACAAGCCAGAACCCTCTGATGGTTGAACGCTATGCAGCTAGAATGAAGGACGGAAGCTTGGCAGGTGACGGGGCT
10 AGGTGTGCACATGGCCAGTGGATGATGGGACTTGTATGCCTACCTGGCATTTGTTCTCTATTGTGGCTAGGGACTCTGCAGTA
TATGGCCCCGAAATCATCGACAGGGCCCGGAGGATATGGAAGGCAGCTGACATCTGGTCTCTGGGCTGCATGTAATCGAGA
TGGCAACAGGTGACCCGCTTCCATGAATAGGGAGCCCTCAGGCTGCATGTTTCAGGCGAGTCTCTCTGGGGTGTGGCCTACG
GAGGGTGGGCGAGCCAGATGGGGCCAGTGGGGTTATCTATCCCATCTGCCACCTCCGAGGTGGGATGTACAAGGTACATCC
ACCGTGTCCCGGTTCCCTGTCTCAGTGTAGGCCCCAAGCCTTCTCTCCGAACCTTTTGAAGCAGATCCCGCCTCCGAGCCAGTGGCC
15 AAGAGCTGTCTGGGAGACCCCTTCTTACGCCAGGGAAGAGGAGCCGAGCCCGGCTCTCTCGGCATACCTCCCGCCCTCAGGT
GCTATGGGGTGGAGGGGACAACCTAGTGAAGGGGAGAGGGCTGATGAGGCGAAAGACTAACAGCTTTGTTCTCTCCCTCAGGGC
CCCCTTCCGTCCTTCCAGTCTTCTCAGTGTACTCAGCCACACAGTCTCAGACATTCCCAAGGCCAGGCACCTCTCAGCACCA
CCCAGCCCCCAAGCGCTGCCTTAGTTATGGGGACACCACTCAGCTCCGGTGAAGCGCTAGGGTCTGGAGTGGGTTCTCTTCTAT
CTTTTTTCCCGTGTATTAATTTCTCCAGAAAAAAGCTCCCTCCGGTGCAGAACACCTGACCATCCCAAGGACCGCTATC
TACTACTCTCTGCCCTCTCCAGATGCCGGTGGCATTCTCTGCCAACCCCGAGATGGGCTTAATTTCTATTATCCCGTGAAGT
20 AGGCATAAAGAGCCAAAGATTCAACCCCTGCAACATAGGTGGTTGGTTGCTATGGTGTGCCACCCCTCCATCTAATGCCCTCAAT
GTGCCAGTGTGCCGAGGAGCCCGTGCAGGAAACCCGCTCCGAGAGAGTTCAAGCCTGAGTCTGCTGCACAGGAGAG
CAAGCCCGGGCATGCTGGCTGCGGTCTGGAAACAGGAGGTGCCACACTAGCAGAGAATCTCTGGAAACAGAACAGGTGGGCG
GCCGCCCCAGCGCCCTGTTGGTCTGAGCTGGGATAAGAAATTTATAGTGCACCGGCGAGCATCTCTGTTGACTGCGGATGCGAAC
ATCCACGAGCTCCCTCTTTTAGGACTCTGCATCAGCAAGATTCTGTGGAACCTCTGCTTCCGTCCTTGGGGCACAAATCC
25 AACTCTTAACCGCCGAGCTGGCCGAGCTGCGGACCTGCAAGCTCAGCTGCGGGCCAGAGCTCGGCTCTGCGCTTTTG
AAGGGCCCGCTCTTCCGCTTCCAGACGCGGTGAGGAAGTATCTCGAAGTTAGGGCTATGCAATAACAGGTGCGGAGCAAGATCT
TGATGTCCAGGATTCTATGATTCCAGGAAGACGATGTCAGTCTGCTGCTTCCCTGTCCACCCCTTGAGCCCAAGTCCGCCCCAC
CTCTTTTAGACTGCGCCGACTTTCTAGGGCTTTGCAACTCAAGCCCACTCTGTTTGAAGTTCAACTGTCTCAACCGCCCTTC
CTTCCCTCCCGAGTGAAGCAGATCTCCGACAGCCAGATCCGCCCACTGGATGTTCTGTGTGAGTCTGCTCTCAGCCGTG
30 CAGTCCGGGCGGCTGCGGTGCTGGAGCGGGTAGGTGGGTTGGATCCGCGCGGCGGCGGGGCGGGGTGCGTGGCCCTGGG
GGCGTGGCGAACAATAAATTTGGTACTTCCGCGCCCTCCCTCTCTCCCTGACCGTCTGGGTCTTAACGCGGCGCGGCGCCACCTGG
AGTCTAGTCTACTCAATTTGGTAGAGTGGAGAAGAAAGCGTCTTACCGAGGTGAGAAGAGTCTAGTAAGAGGAGTCCAGCAG
AAACCTCAGGAGACCCAGGCGCTGAGAGCCAGCTCCACAGAGCAGGAGCCCACTCGTTGATGGTGGAGTTGGGCTTTTGGG
35 AGCCGAGATGACAGGTGAAGCCTTTTGAATCACTCGGATAACCTGCAGAGGCTTCAATCTGAGGCTTCCATCTTACCACTC
CTACCTTCCCAAGGCTTCCGGACCTTCTGGCTGAGAAGAACGTGAGTGCCAGGCGCTGGTGAACAGGCCCTGCATCGGGTGCA
TGAGAGACAGGAAGTATGCCCCAGCTTCCGAGACCCAGGTGAGCCGACTGACTGGGAAATGGTGAAGTGAAGGCCACAGAG
ACACCTTTGCCCTCCCTCATCACTGCTTTTTCAGAGCCACTCTCCCAAGGACCAAGAACTGGTGGTCTCAGGAAGTGA
40 GTGTAGATCCAGCCATATCCAAACGGTGAAGTGTGAGTGGCTCCCAACCCACCCACCAAGGCATCTCTCTGTCTTCC
AGCTATTCAAACTTTGTCTGCTGCAAGAGTGTCAATAGTGAAGAGCCCTTAGTATGCACTCTCTCTCATTATAGGGATGG
GGAACCTCAGGCCACAAGGGGCGCTGCTGCTGAGAGTTCTGTTAGAAGCAAGAACCGAGTTTCTAGTTGAATTTCTGTGCACT
TGATCTTCTGCTGTTCTGCTGTTCTCGGTCTTAAACAGCTCTGAGTCTAGCTTCAACCTTCAAACTGCTGCTGCGCA
CTCAAGATGATCTAGTCTACACAGAATCAGGTATGCTTGGGCTTCCAGGGGTGAGTCTAGTACACTTGTCTAGCAATTTAGG
45 ACATCCCTTCCCTATGGGCTGGCTGCTTGTCTCTCCCTGAAAACCATAGTGGTCTCTAAAGAGAGGATGGGCTGCTCT
CTGGCTGAATTACATTGATCCTGATGTTCCAGGGGAGGGATGGTATGCGGATTTGGAGAGCCATCTTGGCAGCAGAGGA
GCCACATCGGTACCCCACTACCCCGGACGCTGAGTGATGACATCAAAGGACACAGATACGGATGGATGAACAGAGAAGACACAA
ACAGCTTTGGACACACCTGTCTAGAACCCAGGAGCACTACAGGAGCAGGCCCAACCCCAATGGGTGGAATTAAGTAGGAGGC
50 ACCCAAGGACACTACATACAACTAGAGCTTAAACAGAACTTGTCTACCATGCTTGTCTTGGCACTCAGAGAGGCTGTTGG
GGGAGTGAGGAGTGTCCAAGGAGAAGCCCTTGAAGTCTCATGTCTGAGTGACCTTTTTCATTCTCTGGGCTTCAAGCTAGT
GCCTTACTACCCAGACTCATACCCAGTTAAGCAGTCAAGTCTGTAAACAGACTTATTGATTCCGGCCATGGGTGTGCTTTA
GGTGGGGGTCCACAGAGGGGTTTGAAGGCTATGCCCTGGGACCAAGTTGGTTCTGAGGGGCAAGAGCCATCCACCTCA
55 CAGGGCCGCTCCAGGAGTGTCTGCCACAGCTGCTTCTCTCCGCTGTGGAATCCATCCAGGCGACCTGAAGCCCATAACTGCTGCC
TGGATGTGGGTGAGCCAAAGTGGAAGCTACTGTTACTTGGAGACTCCGGTCCCAAGAGCAACTTTCTGGTCCAGATTATGAT
TGTGCCCAAGCATCCGAACCTCCAGCTTGGCTCCCTCAAGGCTGCTCTGCTCACCTGTACCAAGGCTGTGCTGCCCCC
CCAGCTGGCAGTGGCCAGGGCCCATGGTCCACAGGGAGAGCTCGGCACAGGCTTGGGCTAGGTGAGCAGGCCGAAGCCGTCA
60 TAAACCATGGTGTGGTTGAACACAGGGCTGAGACTTCTTGAACCACTCTTGTGCGTTGGCGGCTGGCCGACTGTCTCAGGCAG
CACTGAGCTGCGACAGGTAATAAGGAGGGCTAGTCTTAGGCAATCACCTCTGACACTCCCTCCCTGAGCCAGGCAGGCACCAT
GTCTGTCTTCTATATGGCCGTGTTCCCTGACCGTTCCCTGGCCCTGGCTGAGATCAGGTCTTAGCCCTCTTACACTAATCTT
TTCTTAAGGCTTCGTACGTGAAGCTAACTGTTTCAAGGATTCCAGAGAGAAGTCTCTGAAATGCAATTCTGCTATTTCTGGCCCA
GTAACCTTCAGTATCTCTGCTCCCTCCCTTTAGTTTCAAAGCCTCAACCACTCTGTAGAGTAGAATAATATTACTCTGATATAGA
65 GTAATAGAAAGGAAGCCAGGACGGGAGCCCAACTCAGAGCAGTCTACTCTGTTTCACTCTGGAGGGTGGGTAACAACACCTGA
AGCACCAGAAACACTTTTAGAGGTTCTGTAAAACTTACTTTGTAACACAGAGCTGGGGTGTAGCTTAGTGGTAGAGCCATAT
ATGTGTGTATGTATATATATGATGATGCTTAGGGTGAAGCATTACGGTCAGTTCCGAGCATGTTAAAGACAACCTACAAT
TCATAGTGGTGCATAGTAGGTGCACAGCCTCTGCAGACTGCAGCCTATGCTGGCTAATGTCACTTGACACAACCTTGAGCAGTG
70 GTTCTCAACCTCCCTAAGGCTGTGGTCTTTAAGACCCCAACCATGAAATTTATTTCTGCTTCTTGTAACTGTAATTTGCTA
CTGTTATGACTTGTACTGTAATAATCTGATGTTTGCACCCACAGGTTGAGAACCAGTGAAGTCTCTGAGAGGAGGAAT
AAGCTAAGCAAAATGCCTCCATAAGATGGGTGATGCCGTGGGCCAAGCCTGTAGAGCATTCTCTTAAGTACTGATTGAGCAAGGCTAA
GCAAGCCTTGGAGAGCAACCATGAGGAGCCAGGAGTCAAGCCCTCTCTGTTGGCTCTGCTACAGCTCTGCTTCAAGTCTCAGTCTC
75 CTGCCCCGTTTGAAGTGTCTGCCCTGGCTTCTTCACTGATGAGTACAGCTGGAAGTGTAGAACCCTTCTCTCCCACTGCTT
TCTGCTGCTGCTGTTTCTCAAAAATAATAGAAACCTTAACCATAGAGCCCTTAGTTCCCAACTCAGATTGTTGTTTACACA
AGGTCTCACTATGTAGCTTGGGCTGACCTGGAAGTGTAGAGCAGGCTGTCTGGAAGTCAAGAGACACCTGCTCTTGGC
TCCCCAGTGTGGGATTAATAATGCACACCAACCAAGGAGTGGTGAAGTATGCTTTAATCTAGCACTCGGAGGAGCAGAGGCA
GGTGAAGTTCTGAGTTCCAGGCGAGCCTGGTCCACAGAGTGAAGTTCCAGGACAGCAAGGCTACACAGAGAAACCTGCTCGA
ACAAACAAAAAATAAAACCCAAACATGCCCAGGACCTAGCTTAAGCTTTTATTTTGAAGACAGGATCTGTGTATCCCATGT
AGCCTTAATGACCTTGAAGTAACTCTCTGCTCCAACTCTAGTTTATGTAGGTGTTAGAGATCAACCCAGAGCCTCTTGCATGC
TAAGCCAGCAACTCCACCAACGGATACCCAGCCCCAGCCCCCACTCAACCCCTGCTGGCTTATCACTCTGCTGCTGTGATC

213

GGGGTTGAAAAGGGAGGAGGGCAGCTCAGGGGAGGTCCTGGCTGTGCTCTCCTGCCCTGGTCTCCTCCAGCTGAGTCAGT
 ATCTAAGCACAGCAAGCAAGCGAGCTCCTCTCTACCCCACTTTCCCTCCGGGGGTTTCTGCATCTCCATCGCCATAGCCCTGGG
 CCGGATGCTGCTCACTGACAGTACTTTCTCTGTACTTGAGGTGCTGGTATCAAGCTAGCTTGGGACTTTTCTATGGCGGGGT
 GTATGAGCATGCGCGTCTCTGTCTGCTGCACTTAGTAGACATGCTGCAAGCCAGGGTAAACATAGCATCTGTCCCTGAGT
 5 GCTGTGTTGCCCTTATGATACTACAGAGTCTTACAGGAGTGTGCTGCTGTGGGAGTACTTGTGGAGCCAGTGGCGTGTGGGT
 ATGTGCATTTCTCTGTGTGGTCAGCCAGCCAGGCTGGCTGGCTGTGGTGTGTATGCTAGTACCCGGGGGGCCACCAGATAT
 GGGAGTGAAGGTGAAGACATTTGGCAAAATTGCTGGCTTTGTCTGACAGGTTGGCTTGGTCTGGGCTGTGGGCTATACAAGGC
 CAGGATCTCTACCTCAAGTTGTATCTTTTCTGAGGTTAGATTAAGGATCAGGTGTCCCTTGGCTGTACTAACACTGTGGGACA
 GGGACCCCTTTAGTGATAGAAAGTCTGTATGTGTATCTGGGAGCCAGAGTCATAATCTTGCTTACACCTCACCCCACTCCGCCC
 10 AAACTCTCTGAGGTACCAGAATGTGGTCAGGACACCAGGTGGCAGTGCTGTCCCTTAGACCCTGGGTGTGTACCTGTAAAGGGTC
 CAGTAGGACGACAACTTCAAAGGCGACTCCAGCTCTCCAGGAAGACAGTTTACAGAGACTAGAAAGGCTGTGGGCACTAAAGCTGAC
 TCGCCAGCAGCTGCTGCCCACTCCGAGGAGGTGGAGGAGGAGACACTCAGCAGGGCTGGTGCAAAACCG

MOUSE SEQUENCE - mRNA

15 TCTGGGTGTAGCACGCTGGCGGTGACTCCAGGACTCTTCTGTGACCTGTGAGCCGAGGATTACTGGGTACCCAGATTCCAGA
 ACCCAGTCTCTGGATTGCAGATCTGTAAGGACCGCAAGAGATTGAGCAAGAAGTCTTTCTGGACTTAAGAGTTCGGGAACAGGACG
 TCCAGCCCATCTCCGATCCGAGTGGATCCACACTTCCAGCTCTGCGCCCTGTCCCGGTTTCCCGCGCCCGGCCCCCGCTCT
 GAGCGCCCCGATGGCGGGGCTATGCTTAGGGCCGGGGTCTAGAACGGGCGGGCAGCTGCTGGCAGGACCCGCTGGCGGAGGCG
 CTGAGCCGGGGCCGCTCTCTCTGGGTCACGGGTGGGGCTGCGCGCGGAGCCGGCTCTCAGTGTGGTCTACGTGCTGACCGG
 20 GAGCCGGGGCCGGGGTGGAGCCCGGTGCGGAACCGAGGCAGAGCCGCTGCGCTTGCGATGCTGCGCGAAGCTGCGCTCAGCT
 CCAGGCACACGGCCACCCCGCAGCTGCGCAGCTACCCCTTTGCGAGCTGGCGCTAGGCGACACCCGCTGGACTCCTTCTACAA
 GCGGATGTAGTGGTCTGAGGAGTGAAGCTCCCTGGCAGAGCTTCTTGTCTACCACTCCGCGTGGCTGAGAGCTTCTCAGCAT
 GACCAACAACGCTCTCTCTGTTCCAGGAGAGCTCCCTGATCTGAGGCCCTTCTGAGGATGTTTCCAGAACTCCGAGT
 GTGTTGGCAGCTACACACTGATTCCTTATGTGGTGAAGCCACTGGCGGGGCTTATGTGGCGATGACGGCTCTGAGGGGATA
 25 GCGGATGGGCTAGTACAGGCTGGGGCGGGCACTGAAGCCCTCTCTCACTCCCTGGTGGGCGGGCTGTCCGTCTGTGGAGGCTAC
 ACCCAGAGACTCTTGGCGCTATTCCGGGAGACCATTCGTGAGGATATCCGGCAGGCTCGGAGCGATTAGTGGGCGAGCAGCTGA
 GGCAGGAGCTGGCTCGCTGCGCGGAGGCTGGACAGCGCTGGAGCTGCTGAGCCCTGACATTGTGATGATGATGATGATGATGAT
 CGCGATGTCCAGGACTACTCGGCCATCATTGAGCTGGTGGAGAGCTGCGAGCTTTTGCCCACTGTGATGTGGCTGAACAGCACAA
 TGTCTGCTTTCACTACACATTGCGCTCAACAGGAGGAACAGGCTGGGGACCGGGAGAAAGCCCTGGCTGTCTGTCTGCTGCTTGG
 30 TGAAGTATGAAGGTCCCGTGGCTCCGATCTGTACTGCTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGT
 AATGCCGGGACCTGGAGCAGGCTTACTGCTGACCGCAAGCGCTTGTATGTGGAGCCAGCTGCACTCAGGCATCAATGCAGC
 TGTTCTCTCTATTCAGCCGGGCGAGCATTCGAAGACTCTGAGGAGCTCCGGCTGATTGGCATGAAGCTGGCTGCTGTAGCCCC
 GCAAAGGCTGTGTAGAGAAGATGCACTACTAGGGATGTGGGATTTCTACCTGGGAGCCAGATTCTTGCAACGACCCCACTCCAG
 GTGGTGTGGCTGCGAGCACTGTACAAGCTTAATGCCCCATTTGGTACTTGGTCTCCGTGATGGAGACCTTCTACTGTACCA
 35 GCATTTCAAGCCACACAGAGCCCTCAGGAGGACCCCGCTTCGAGCTCACTTCTGGCTCCACTTCTGCTACAATCTCTGCCAGC
 CTTTCAAGATGGCTCTCTCAGGAGGACCTGCGCTGGTACTGCTGGTGTGGAGATAACAAGGTCTGCTGCTGCTGCTGCTGCTGAG
 ATTCAGGGAACAGACCCCATGAGCGCAGTGACCTAAGCTTGTGGAGCCAGAGACTCAGGAGGATCCTTCCAGCTGGACCTTCCC
 AGTCACCTCCATCTGTGGGATCAGCACTTCCAAGCTGGAGCAGGCTGCTGCTTCTGTACGCACTTCTCCGGCCCAAGGAGCTCC
 AGCTGTGCTTTCCAGTGTGGAGCGCTGCGCAGCGTCTGTGGCTAATTACAGTCTTGGTGTGATGAATCCAGATTCTCCGCGCC
 40 AGTGAGGAGCAGAAAGCGCAAGGGAGGTGTGGAGTTGATATGAATACTCGGAGACCGGTGAGCGGCTGGTGTGGGCGAGAG
 CACATATGGGTTGGTGTATGCCGGCCGAGACAGGCACACAGGGGTACGAATCGCCATCAAGGAGATCCAGAGAGAGATAGCAGAT
 TCTCTCAGCTCTGATGAAGAGATCGCTCTTCAAAACGACTTCGTATAGAATATTGTGCGTTATCTGGGCTCAGCCAGCCAG
 GGCAGCTACCTCAAGATCTTATGGAGGAAGTGCCTGGAGGAGCCTGTCTCTTGTCTAGGTAGTGTGGGAGCCCTTAAAGGA
 CAATGAGAGCACTATTAGCTTTATACACGTCAGATCCTACAAGGACTCAGTACCTCCATGAGAACCGCATCGTTACAGAGACA
 45 TCAAGGGAGACAAATGTTTGTATCAACACTTTCAGTGGGCTGCTCAAGATTTCTGACTTTGGCACCTTAAAGCGGCTGGCAGGCATC
 ACACCGTGACCGAGACTTTTCAAGGAGCTTGTAGTATATGGCCCCGGAATCATCGACAGGGGCGCGGAGGATGGGAAGGC
 AGCTGACATCTGGTCTCTGGGCTGCACTGTAATCGAGATGGCAACAGGTGCGACCGCCCTTCCATGAAGTGGAGCCCTCAGGCTG
 CGATGTTTCAAGTGGGCGATGACAAGGTATACCAACCGTCCCGGTTCCCTGTGAGTGGAGCCCAAGCCTTCTCTCTCGAAT
 TTTGAGCCAGTCCCGGCTCCGAGCAGTGCCTCAAGAGCTGTGGGAGACCCCTTCTTCAAGCAGGGAAGAGGAGCCGAGCC
 50 GGGCTCTCTCGGCATACTCCCGGCGCTCAGGCGCCCTTCCGGTCTTCCAGTCTTCCAGTCTGACTCAGCCACACAGTCTCAGA
 CATTTCCAGGGCCCGAGGACCTCTCAGCACCCAGCCCGCCCAAGCGCTGCTTATGTTATGGGAGCAGGATCAGCTCAGCTCGG
 GTGCCGAGGAGCCCGTGGCGAGGAAACCGGCTCCCAAGAGAGTTCAGGCTGAGTCTGCTGCAACAGGAGGAGGAGCGCGG
 GCGCATGCTGGCTGGCTGCGGAGCAGGAGGTGCCCACTAGCAGAGAATCTCTGGAACAGGAAACAGGACTCTGACTCAGCA
 AGATTATGTTGGAATCTCTGCTTCTGGGCTTGGGGCACAATCCACACTCTTAACCGCCCGGAGCTGGCCAGGAGCTGCGGACC
 55 CTGCAAGCTCAGCTGCGGGCCAGAGCCTGGGCTGCGCTTTTGAAGGGGCGCTCTTCCGCTTTCCAGACCGGCTGAAGCAGAT
 CCTCCGAGACCCAGATCCGCCACACTGGATGTTCTGTGTGGACTCGCTGCTCAGCCGTGAGTCCGGGCGGCGCTGGCGGTG
 TGGACGCGGAGTGGGAGAAAGCGGTCTTACCGAGGTGAGAAGTTCAGTAAAGAGGAGTCCAGCAGAAACCTCAGGAGAGC
 CAGGCGCTGAGAGCCAGCTCCACAGAGCAGGACCCCATCGTTGATGGTGGAGTTGGGCTTTTGGAGCCGAGACTGACAG
 GCTTCGGGACCTTCTGGCTGAGAAGGAACGTGAGTGCCAGGCGCTGGTGCAACAGGCGCTGCATCGGGTGCATGAGAGACAGGA
 60 AGTATGCCCCAGCTTCCGAGACCCAGCCACTCTCCCAAGGACAGAACCTGGTGGGTGGCTACAGGAAGTGAAGTATAGTACACAG
 GCCACTATCCAAACGCTCCTGAGTATAGCTTCAACCTTCAACCTGCTCACCTGTGCCACTCAAGATGATCTAGTCTACACAG
 AATCAGGGGAGGAGTGGTATGCGGATTTGGAGAGCCATCTGGCAACAGCGAGCAGGAGCCACATCGGTACCCAGTACCCCGGG
 ACGCTGAGTGAATCAAGGACACAGATACGGATGGATGAACAGAGAAGACAAACAGCTTTGGACACACTGTCTTGAAC
 CCAGGAGCAACTACAGGACAGGCCCAACCCCAATGGGTGGAATTAAGTGGAGGACCCCAAGGAGCACTACATACAATCATAG
 65 ACTATTAACAGAACACTTGCTACC

MOUSE SEQUENCE - CODING

70 GCGGGGCCATGCTTAGGGCCGGGGTTCTAGAACGGGCGGGCAGCTGCTGGCAGGACCCGCTGGCGGAGGCGCTGAGCCGGGGCCG
 CTCGCTCTCTGCGGTACGGGTGCGGGCTGCGCGCGGAGCCGGCTCTCAGTGTGGTCTACGTGCTGACCGGGAGCCGGGGCCCG
 GGTGAGGCCCGGGTCCGGAAACCGAGGAGAGCCGCTGCGCTTGGATGCTGCGCAAGCCTGCGCTCAGCTCCAGGCACACGGCC
 ACCCCCGCAGCTGCGCAGCTACCTTTTGGAGCTGGCGCTAGGCGACACCGCGCTGGACTCCTTCTACAACCGGATGTAGTGGT
 GCTGGAGGTGAGCAGCTCCCTGGCAGAGCTTCTTGTCTACCACTCCGGCTGCGTGAGAGCTTCAAGATGACCAACAGCTGC
 TCCTCTGTTCCAGGAGAGCTCCCTGATCTGAGGCGCTTCTGAGGATGTTTCCAGAAGAACTCGGATTGTGTTGGCAGCTAC
 75 ACACTGATTCTTATGTGGTGAAGCCACTGGCCGGGTCTTATGTGGCGATGACAGGCTCTGAGGGGATAGCCGATGGGCTAGT
 ACAGGCTGGGGCGGCACTGAAGCCCTCTCACTCCCTGGTGGGCGGGCTTGTCCGTCTGTTGGAGGCTACACCCACAGACTCTT

HUMAN SEQUENCE - GENOMIC

40 ACCACGAGCAGCAAGTAGGGCCCAAGGGGTGAGCCAGGTGAGTAAGTGGGGCTGGAGGCCCTCCCCGTTCTTTGGCCTCTGTCCCTGG
 ACTCTAGGGTGGGATCTCTGCTTGGCTGCTGTGGCTATGAGTGGCTCTCTCACAGGGGAATGGATGCTCTGGGAGAGTGGGGAAGGAT
 TAGGAGAAGGGCCTGGCTACCCATATGATGGCCCTCCTATTGGGGATGGAGGGCTGGGAGGAGTGGGAGGATTAGGAGAAGGGCCT
 GGGTACCCCTATGAGAGGCCCTCCTACAGGTTTGGGAAGCTGGGAGGAGTGAGAGGATTAGGAGAAGGGCCTGGGTATGCCCTATGAT
 GGCCTCTACAGGGTATGGAAGCTGGGAGGATGGGAAGGATTCGGAANAAGGGCTGGGTACCGGCTCCACTGGTGGCTCAGCG
 45 CTGGGGTGCTGAGACATCAGAGCCAACACTCATCCCTTCTCTGGGGCAGGAGATCCAGTGAACCTGCTCCGGTGCCAGGAAGGTG
 GGCAGCCCTTGCCAGGAGCCAGGAAGCTTGGGATACATGTTGTTGGGTGTTGGGCAGACCCCCAAGTGTGCGCCAGAGTCTTCCCAACA
 GCCTCTCAGAAGCCCTTCTTCAGGACCTGAAGGAGCCAGAGGGTCCCTAGGGTCCCAACTGTTTCAGCTCTGGGGGCTGGGG
 GTGAGGAATAAACCCTGGGCACCACCCAGTCCATCTCCCTTTTCCAGGCCCCAGAAACTGCCGGGAGCTGTTGAGCCAGGGCGCC
 ACCTTGAGCGCTGGTACCATCTGTGGCTACTCTGAGGCGAGGGCCCTCCAGTCTTTTGTGACATGGACACGAGGGGGGCGGCTG
 50 CTGGTGGAGTGTCTGAGAAATGGGCTAACGCGCAGGCCCACTGGTCACTTCTCCCTTGAGCCCTAGGGGAGCCAGGAACCCAC
 AGAGCAAGGCATTTCCTAGAGGAATTCTACTGACAAATGTTTATGTAGCCCCCAATGGGACCTGAAGAAGTATGAGGGCTTCACAGA
 GGAGGTGCCATTTGAAAGAGCTTAAAGTTAGTGCAGTAGCTACGCGCTGTAAATCCAGCTACTTGGGAGGCTGAGGCCAAGAGTAT
 TGCTTGAACCCAGGAGGTGGAGTTTCAGTGCAGCGAGTTCCTTGCAATTCGACTCCAGCGCTGGGTGAAAGAGTGAACATTCCTCT
 CAAAAAATAAAAAAAAAAAAAAAAAAATAGGTAGGGAGGGGCATTCCAGCTAGAAGTAAAGATAAACTCAGGGAGGCAGCAGAGT
 55 AAAAGGTTTGTCAGGGAAAGCTGCTGAGTGAGCTGAGAGCAGGCGTGGGTGTCGGGTAAAGTCTCCGCCGACTGACGGAACATGGGATTG
 AGGACCTCTGTAAGAGCCAGTTCTGGAAGGCCATAAATGATCAACTAAGAAGTGTGCAGCGCGCCAGACGCGGTGGTTGGATTG
 RACGTTGGTGCTCAGCCTATGATCCAGCACTTTGGGAGGCCAAGCGGGCAGATCACCTGAGGTCAAGAGTTCGAGATCAGCCT
 GGCCAACTGGTGAAGACCCCATCTTTACTAAAAATATAAAATATGACGAGCGCTGAGTGGTGGCGGCTGTAATCCAGTTATTACG
 60 GAGGCTGAGCTGGGAGAATGTTTGAACCCCGAGGTGGTGTGCACTGAGCCAGAGTATGATCTACTGACTCAGCTCCAGCTGGGCAA
 CGGAGTGAGACTCTGTCTTAAAAAAAAAAAAAAAAAAGAGAGTGTGCAGGGCAATGGGTAGCCCCAGGAGAGTTTAAAGCAGGGG
 AGGGGCCAAGTAGAACTCTGTGTTTAAAAAGATGATTGGGCTACACCATGAAAGAGCTGATCTGGGGGACCAAGTGGAGGCAG
 GGACATGGTTTAGGAAGACAGCAAGGAGCAGGCAGTAAAGACAGTGGAGCAGGCTGCACAGTAGCTGCACAGTGTAAATCCGAC
 65 CACCTTTGGGAGGCCGAGGTGGGTGGATTGCCTGAGCTCAGGAGTTCAAGACCAGCCTGGGCAACATGGCAAAACCCCATCTCTA
 CTAAAAATACAAAAAATTAGCTGGGCGTGGTGGCAGGTGCTGTAATCCGAGCTATGGCAAGAGTAAAGCAGGAAATTGCTTGN
 NNNNNNNNNNNNNNNNNNAGCCGAGATCACCACTGTACTCCAGCTCGGTAAACAGGCTGGAGACTCTATCTCAAAAAATAAA
 TAAATAAAAATAAGACAGTGGAGCAATGAAATAGAAGTACTTAGGTTGACAACTCTATAGGACCTCGGGCCTACTTGGCTTGGAGG
 70 GGGAGGTGGAAGACATCAGGGTAAAGGCCAGGGGCTCAGCTTGGGCTGTGGGAGTGGCCTCTCTAATGTAAAAATATCTTGGTTTTTT
 GTTTTGTGTTGTTTGTAGACAGGAGTCTTGCTCTGCTGCCAGGCTGGAGTGCAGTGGTGTGATCTCGGCTCACTGCACTTCC
 ACCTCCAGGTTCAAGCAGTTCTTGCTCAGCCTCTGAGTGTGGAAGTCAAGGTCAGGTCAGGACCAACCCCGGCTAAATATT
 75 GTATTTTAGTAGAGACGGGATTACCAATGTTGGCCAGGCTGGTTTCAAATCCTGACCTCAAGTGATCCACCGGCTCGGCGCTC
 CCAAAGTGCTGGAATTACAGGCATACAGGCACCAAGCGCTGGCCAAATATCTTGGTCTTATAGATTAATGAATTTGGTTATTTGAC
 TGACACCCGACCGCTGGCCATCTCTCTGGGTGGGGACAGTGTATTGTCAATTCAGTCTTCCAGGCGCTGCAGGCTGGTGGCA
 TGAAGTTGAGTGTGATCAAGAAAGTAAACAGGGGAATGAGAGTTTATAGAAATATTCAAAGCTAACTTGAGGAGTCCCCATTGATC
 AACAGGCCCAATCCAAAGAGAGAGTGGGTATCCACCACCCCTCAGAGTCTCTGAGCCTCAGCTGAGGCTCCGAGCTTGGAT
 AATAGCTGTGTGCCCCCTCCCCAGGCTGTTTCAGAGGCGCAGGAGTGGTCTGTGGATTCTTCGCGCTCTGGTCTCTCTACA

5 GAGCAGGTTTGGGAACCAAGAGTCTGAATTCTGGCTGGGAAATGAGAATTGACCAGCTTACTCTCCAGGTTGAGTTCACGCA
GGGTCTGGAGTCTGGGGTTACTGTCTGCCATCCTGAATCCCTGCCCCACCCCAAGAACTGAGGATTCTCCATCCCTGCCTCC
CCTTCTTTCCAGGTAACCTGGGAGCTCGGGTAGAGCTGGAAGACTTTAATGGTAACCGTACTTTCGCCCACTATGCCACCTTCGCG
CTCCTCGGTGAGGTAGACCACTACCAGCTGGCACTGGCAAGTTCTCAGAGGGCACTGAGGTGAGTGAAGGGAGCAGAG
10 GAAGGAGGCTGGATCCTTTCCAGTGCTGCCACTGCCCATGAATGACCCAGGGCAATCCTGTCTCCTCTGTGGGCTTAGTTTC
CGCATCTGAGAAATGGCAATCATGAAACAGGATGGTGCAACAGTGAAGAAATTGGGATCTGGAGGCAACAGACCTGAGTTGAAT
CCATCTCTGCCATTTAGTACTTATGTGACTTGGGCAAGTCTACCCCTCACTGAGCCTCAGTTTCTCTCTATAAAAATGGGCA
GGGAGGCCCGGCACGGTGGCTCATGCTGTAAACCCTAGCACTCTGGGAGGCCGAGGCGGGCAGATAAATTGAGGTGAGGATTCAA
15 ACCCAACCTGGCCAACATGGTGAAACCCCGTCTCTACTAAAAATACAAAAAATTAGCCGGGCGTGGTGGAGGGTGCTGTAATCC
CAGTACTCGGGAGGCTGAGGAGGAGATCACTTAAATCTGGGAGGCGAGGTTGACGCGAGCCAGAGAGTGTCACTGCACTCT
AGCCTGGGCGACAGAGCGAGACTCCATCTCAGAAAAAAGGCGGGGGGAGCGCAGGGAGGCAAGGAGGAAGTTTGGGGTG
CGCCTGAGGCTCTGTTGAGTGTTAGTGTTCTCTGCTTTGGAAGAGGAACACGGAAGTCTTCTTTCAGAGAAACAGTGAATTTGG
GGAGAGATTTAAAGAGGGAAGTGGTTATGAGGGAGTGCTCAGGGAACACCTTCTGCGCCAGGCACCTAAGAGGTTCTCCCA
20 GCTTTCTAGCAGAGTTGCTCAGACTGGATGGGAGCTGAGAGAGACAAAGGAGCTAGAGGGGGCGGGGATTTGGAGGGGT
AAGACAGGGGAAAAGCTGGGAGCTTTGGAGCCAGACAGTCCGAGTTCAAGTCTGCGCTGCTTCAACAGCCGAGTAACCTG
CGCAAAACACCTGGCCCTTGGTGTGCTCGTGGGGCTGATAAAATCAACTCTTAGTTGCTCTGAGACTCCCATGGCATTATAT
CTCCAAAGGTGCCAGGATGGTGTGCTGGGACCAAGGTGCTTCCATCCCTTCCCTGCTAGGGGATTCCTGAGCCTCCACAGTGGG
25 AGGCCCTTTACCACCTATGACGCTGACACGATTCAAGCAACAGCAACTGTGCAGTGATTGTCCACGGTGCCTGGTGGTATGCATC
CTGTACCGATCAAACTCTCAATGGTGCCTATGCACTGTGAGGCTGCGGCCCAAAATATGGCATTGACTGGGCTCAGGCGGTG
GTGTGGGCCACCCCTACCGAGGTTCCGATGATGCTTCGATAGGGCACTCTGGCAGCCAGTGCCCTTATCTCTCTGTACAGTT
CCGGATCTGTCAGCCACCTTGCCTTGCACACCACTCTGCTTGCCTGTCCACATTTAAAAATAAAATCATTTAGCCCTTCAAGA
CTCTTCCAGTTACTGGGAAAAACCCCTAGAGGGCAGAGCAGGGACACAAGTTTCACTCCATTAGGGAAGAAATTTCTTCCAGTC
30 AGGAAGATGGAAGGACAGCCTCTAAAGTAGTGAGGCTTCTGTCTCTGAGGTTGTCAGACAAGGCCAGAGGGGCATATAGTGA
AGGACTGGAGGAGATTCAAGCATCCATTGACAAATTTCTGAGGCTCTCTGGGTCTGCAAGTGGATGGCTTCTGGCAGGAATGC
ACAAATTGACAGCTTTTTTGTGTT
25 GCACCATCTGGCTCACTGCAAGCTCTGCTCCAGGTTCAAGCCATTCTCTGCTCAGCCTCCCGAGTAGCTGGAATCAAGGC
ACCCGTTTACACGCCCGGCAATTTTTGTTATTTTAGTAGAGCGGGGTTTCTCATGTTAGCCAGGATGGCTCAATCTCTCTGA
CCTCATGATCTGCCCTCTCGGCTCCCAAAGTCTGGGATTACAGGTGTGAGCCACTGCGCCGGCGGCTTTTTTTTTTTTTT
TTTTGAAATGGAGTCTTCTGCTGCTGCTGCCCTGCCAGGCTGGAGTGCAATGNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
30 NNN
NN
NN
NN
35 NNN
NN
NN
NN
40 NNN
NN
NN
NN
45 NNN
NN
NN
NN
50 NNN
NN
NN
NN
55 NNN
NN
NN
NN
60 NNN
NN
NN
NN
65 NNN
NN
NN
NN
70 NNN
NN
NN
NN
75 AGCATGACCAACATGTGCTCCTCTGCTCCAGGCCGACCTCCCTGACCTGCAGGCCCTGCGGGTAGGTGGCTGGGGCTGGTGA

GGCAGGCACAGGGCTGGGGTAAGGCCCTACACAGAACACAGTATCTGACTGTCTGCCTCCTGCAGGAGGATGTTTTCCAGAGAAG
TCGGTGAGCAGAAATCCACCTCTCTACAAAAGTGCCCTTTGACTTCCGCTATGACCTCTGACCTCCCAATAATCCCCCTGGCCCTCT
CAGTCACCTAACCCCCCACCTGACATCCCAAGTATCTCTGTTTCTGCTTGTGCTCCTCTCATAGCAGGGTGCCCTTTCTCGGAT
CCAATTTCCACTGATGCTGACCTTTGATGCTCTCACTCCCCCTTGCTAGCCCTGTGCTGACCTCTGACCTCACTGATTCTGCCTC
5 CCTCCCACAGGATTGCGTTGGCAGCTACACACTGATCCCCCTATGTGGTGACGCCACAGCTGGTCCGGGTGCTGTGGTGATGACGCC
CTTCTCGCGGGCTGGCTGATGGCTGGTACAGCTGGAGTGGGACCGAGGCCCTGCTCACTCCCCCTGGTGGCCGGCTTCCCGC
CCTGCTGAGGCCACACACAGACTCTTGGTAATGAAGGCCCCAGGAGGGGTGCTCCAGGAGGGGGCTGGTGAGGGTACGGTGG
GCTGGGGCTGAGGTACAGGCCCCACCAATCTCTCTCCCTGCTCCCTTACCTAGGACCTCAGTGGCTATTTCCGGGAGACCAATTG
10 GCGGGACATCCGGCAGGCGCGGGAGCGGTTCACTGGGCCACAGCTCGGCAGGAGCTGGCTCGCTGACGCGAGACTGGACAGCG
TGGAGTCTGCTGAGCCCGACATCATATGAATCTGTGCTCTCTACCGCGATGTGCAGGTGGTGGTGTTCAGAGAGGCAGTAGG
GCAGCTGGCATTTGAGGTACGGCAAACCAAAGTTCACTTCTGGGTGGGCCACTTGCTCATCTGAGTGGCTTTGGGCAAATATCAAA
TGTCTCTGAGTGTGGCCCTCTTATTTGTTAGAGAGGATGAGCATGTGCTGCTCTCGGCTCTGGGGCTGGTGGGTTGGGAACGCCA
GCATGGGCACATACAGTAGTTTCTCTGTAGGTTGTGCTCGGGCTGAGGGAGCGGTGCAGAAAGATGGTGGCTGGTGGGAT
TCAGGAGTGGGACAGGACCTGGCTCAAGGTTCTTGGGGCTGGAGGCCATGATGCCAGTGCTTCCGCTTCCCTGATGCAGGA
15 TACTCGGCCATCATTGAGCTGGTGGAGACGCTCGAGGCTTGCCCACTGTGATGTGGCGGAGCAGCATATGTTCTGCTTCCACT
CACTTTTGGCCTCAACCGGTGAGTGGGACGAGCATAGGCTATAGCCACATAAAGTTTCCGAACACTAGGTCTCTGCGTGC
AAGCCATTGCTGTCTGGGATCACTGCTGTTTGGGGAATTTGCTGACCGGGTCACTGATGTCAATAGGTCCCTGTTGTTCTGAGTT
ACTGCTGCTGGGTGGGGTGGGGAGGTTGCTGCTGCTGTGGTATGGTCAACCGTGTCCAAAGATCACTGCTCTTAAGATCACTCG
CATCTAGGAATCACTTCCATCTGAGGTCACTAGAGAGTCACTGCGCAGGTCAATTATTGAGTCAATTTGAGTCAATTTGTCAGG
20 CCTGGAGAGGTCCTGTGGTCTGAGTGTCTGAGGTCCTGGACAGAGTAGGCCAGGGCCATCAGGGAGGGCTGAGCCCATCTT
TTCCCTAGGAGGAACAGGCTCGGGACCGGGCGAAGGCCCTGTCTGTGCTGCTGCGCTGGTACAGTGTGAGGGCTCTGTGGCGCC
CGATCTGCTAGATGTGTGGCCGATCTACAAGGACATGTTCTCAGCTCGGTTCTCAGGATCTGGGACCGGAGCAGGCT
ATCACTGGTAAAGAGCAGCTGAGTGGCCGGTGGCTTAAGCTGTAGAGTAGGAGGGTGGTGTGCTGGGCATCAGTCAGGCCCTGTG
CCCCACCCACCCAGGTATCGCAAGGCTTTGACGTAGAGCCAGCCTTCACTCAGGCATCAATGCAGCTGTGCTCTCTCATTG
25 CTGCGGGGACGACTTGTGAGGATTTCAAAGAGCTCCGGCTAATAGTGGAGCAGAGATCTGGCTCTTGTCTCGTCAACCCAGGGG
TTCCAGGGGCTGGGAAGAGGGCAGGAGAGACACCTGGGCAAGAGCTAGGATGAGCTCATCTTTGGACTGTCTGCGCCCA
TACCCACACCTGGGTCTCATACCTGTTCTGGGCCCTCAGGAGCCTCAAACCCACAATGTTCCAAACTCACTCTGCGTGTCC
ATTACATCTGAAATCCCATATACCTGTGCTGAGCTCCTGTTCCACCCCGAGATCTTGGCATCTATGCTCATATCATATCT
ATGTTTCATGTCCACATCGGGCCACAGAAATGGTGGGCTCACTACCCCTGACCACCACTACTGGAGCCATGCCTCTCTCC
30 CCGAGGATGAAGCTGGGCTGCTGCTGGGCCCGAAGGCTGCGTGGAGAAGATGCAGTATTACTGGGATGTGGGTTTCTACCTGG
GAGCCAGATCTCTGCCAATGACCCCAACCCAGGTGGTGTGCTGCTGAGAGCAGCTGTATAGCTATGATGCCCCCAATGATGAGGTG
GCCCCCTCTGCACTCTGGGCTGACCTGGGCTGTGAGCTCTGCACTGTGCAATGTGCAATGTGCACTGAGTCAACCTGAGCCAAATG
ACCTGGCTGCTTTAGACAGTGGCCGTGGCACCCATGCCAACGTTCTAGCTATATCCAGGCCAGTTTCTCTCTGGCAGTGC
TGGTTGGTGCCTGGGCTGAATCTGAGGATGTGGCTTTCATGCAAGTACTGGTGTCCGTGATGAGACACTTCTGCTCTTACAGCA
35 CTTTCAAGCCACCGCCAGAGCCCTCGAGGGCCACACGCGCTGCCACTTCTGGCTCACTTCTGTCTACAGTCTGCCAACCAT
TCAAGACAGCTGCTGCCAGGGCCAGTGTCTGGTGGAGCTGTAGGGGTGGTGAACCGGGAAGGGGTAAAGCCCTTCTGAC
TGACCCCACTCCCAACTGCTGCTGAGTGTGCTGCTGGAGATGAACAAGGTGCTGCTGCTGCAAGCTCGAGTGTGGGGTACT
GACCCAGTAGACAGCTGACCTCGAGCTGCTGGAGCTGAGACCAGGTGAAGTGCCTGCTGAGGCCCTCACTCACTTGTGTA
GGAACCTTTCTGTGGAGGCTTTCTTCCATCTCTCAGACCCCTCTCTGTCAACAGCATCCCCACACCCCAATTCTCTTGCAG
40 GACATTCCTCCAGCTGGACCTTCCAGTGCCTCCATATGCGGAGTCAAGTATAGCGGGACCTGGGGTGACTGGAAAGACCGGG
AGGTGAGGCTGCTGTCACCCAGCCTGACGCTTACTGGGTTCTTCTATCCCTTCCAGCGCCTCAAAGCGGACGAGCTGCTGCT
TCTCTAGTACATCCCCCGCTCAGGAGCTCAGCTGTGCTTCCCCAGGTAGGACATGCCAGTGGTGTGCGCAGCCTTTCATGTT
CGGGTACTCTGAGGGCCAGGATGCCCGGGGGGAGTGGGGGAAAGAAAGGACGACGTCGTTGGATGCTCCGGCTTAGTGGGG
45 ACCAAGATGCCCCCTCCGCGGGTCTGACTCCCGCCCACTCAGGTTCTCAGGTTCTCGGCCCTGATCAGGCTGGGTGACGAACCCGATTCC
ACGGCGCCCGCGAGGAGCGGAGGCGCGGGGAGATGTTGGAGTGAAGGACCGGGACCTGGGAGTCTCGCGAGGCGGAGGCG
CGCGGCCCTGCTGAATCCCATCTCACCCCGCCCGGCGAGTTTGATTATGAGTACACGAGAGCGGGCGAGCGGCTGGTCTGGGC
AAGGGACAGTATGGGGTGGTGTACGCGGGCGCGATCGCCACACAGAGGTTGCGCATCGCCATCAAGAGAGATCCCGGAGCGGAC
CAGGTGCGGTGCTGGCAGCGCGGGTGGGCTGAGGCTCGCAGGGCCGAGTGAAGCGGGCCAGCGAGCGGCTCTGTGGG
50 CGGGGCTAGTGGCGGGCTCTGAGGACTGAGACTTTCAGGCTCTGAGTCTGGACTGGGCCCTGGGCGGAACAGCCAGGACCGTGGCGG
CGGGATTGAGGTCTGAGGGTCTGTGGCGAGGTAGTAAAGGTGGGGAGGCTCGAGAGAGGCTGTGGGCGGGGCGGGTCTTGTG
GGCGGGGCGAGGCTGGCGGGTGGGATGGGCGGGGCTCTCTCGCCCACTCGGTCCTTCTCTCTCTCTCTCTCTCTCTCAGGTTCT
CTCAGCCCTGCTGATGAAGAGATCGCTCTTCAAGAGCCTCGGCCACAGAACATAGTGCGCTATCTGAGCTCAGCTAGCCAGGCG
GGCTACCTTAAGATCTTCATGGAGGAAGTGCCTGAGGTAACCTGCTGTTGGGATGGGAATGAACCGAGGTGTGAAGCATGGG
55 ACCGAGGCGAGCGGGGTAGAGAGCCCTAGGGGGAAATGACCCCTAGTGGCGTGTGGGTGGTGTAGCTTGAATAGCTGAGGAGT
GCGCTGGGTGATGAGATTGGGCTACAACTAGGTTGCTGCTGGGCTGTGACAGAGAGATGTGGGCTGGGCGAGTGGGTGGGAAGA
ATGAACCTGGACTGTCCCAACCCAGGCGAGCTGTCTCTTGTGCTGCGGTGCGTGTGGGACCCCTGAAGGACAAAGAGAGCACCAT
CAGTTTCTACACCCGCGAGATCTGCGAGGACTTGGCTATGCAAGCAACACATCGTGACAGAGGACATAAAGTAAAGCCCTG
GGGCTGGCCCGCCCTCATCTGCTGAGGTTGGCGGGGAGGAAACATGCTCCGAGCAGGCTGGGATTTAGATTAGTGAAGCAG
ACCTGTTGCAAGAGGTGAGGAATTTCATCAGGGAGGCTCCTTAGAGAAGGAGGGGAAAGGTTCACTCTGAAGCAAACCAATTGTC
60 AGCTCCAGAGGGGCATATAGTGGGATGGCAAGGGGAGAGTGTGACAGAGGACGAGGACAGGCTGGGATCTCCAGGATGGGAT
CCCAAGAAAGAGGTTCTAGTTCTGCTGGCAGGGGCCAGCAGGACTGTCCACTAATGGCTGTCAATCAGGGGACAAATGTGCTGATCA
ACACCTTCAGTGGGCTGCTCAAGATTCTGACTTCGCGACCTCCAAGCGGCTGGCAGGCATCACACCTTGCATGAGACCTTCA
GGTAACAGGTGTGGGGTGGTGAAGTGGGATGCTACCTGGGGCAGAAGATCTTGGAACTTTCCAGGGGAGGGGGTTTCTCT
AGGCTAGGAGTTAGAGTCTTAATGGGGAATGAACCCAGGTTGAGTATTGGGCGAGGCTGAGTGTGAGCTTCTGAACTGGAG
65 CTTGGAGAAGTGAATAATGACTTTAGCACTTGAAGAGTGTGATGAGGCCAAGGTGGGATTTGGAGGAAAAAGCAGGTGATGG
AGTTCAAGGGGACGAGGCAATCCAGGATGTGCTGAGGACACTACTGTGGGTGATGAGTGTGAGTGTGAGTGTGAGTGTGAGT
AATGACGGAAGCCTTGGCAGGCGATGGAGCCAGGCTGGTGTGATGGAACTCAGGATAGATGTTTGTATGACCAAGGATAGGTGTTGAG
TATATTTGGATATAGGTTCAATGATGGGTGAGTGTGCTGCGCTAGGATGAGGCTTCCCTCCCTGCTCCAAACCCCATGATGAAGC
CTAGATGGGATTTGGTCTCCTGTTTCTGCTCTAGGAACCTGCAAGTATATGGCCCCAGAAATCATTGACAGGGGCCACGCGGGT
70 ATGGGAAGCAGCTGACATCTGGTCACTGGGCTGCACTGTCTATGAGATGGCCACAGGTGCGCCCCCTTCCACAGACTCGGGAGT
CCACAGGCTGCCATGTTTCAAGTGAGACTCTTTGGGCTGGGCCATGGAATGGCATAGGGCCAGCTTGGGCTTGGACACTCT
GAATGTCACTCTTGTACCTTCCCCCACAGGTGGGTATGTACAAGTCCATCCGCAATGCCAGCTCTCTGTGCGCGGAGGCC
CAAGCCTTCTCTCCGAACCTTTGAGCCAGAGCCCCCGCTCCGAGCCAGGCGGACAGACATGCTGGGGGAGCCCTTCTCTGACGCC
TGGGAAGAGGAGCGCAGCCCACTCCCCACGACATGCTCCAGGCCCTCAGGTGCTTGGCGGAGTGGGACAGTGGGACAGTGGAG
75 GGCAGAGAGTGTGGAGCTGTGAGGTTGGAGGAGGACGCTGATGGCTGTGCTCTCTCTCAGATGGCCCTTCTGCGCAGTCCC

218

219

GAGGACGCCAGCAATGGCCTCTGCTCTCTCTGTGTCAGGAAGCTGAGGTCCAACAGTCCTTCAGTCTCAGGCTTTGGCCCCATGCG
CCATGGGGAGGGAGGGCAGAGCCCAAAGCCCCCTCTTGCATGGGTGGCCCCCTCTGGGGCATCAGCTGGGGGGCTGTGCCACAGCTG
GGCACACGGAGCTTCTGGGGGAGACCGAGGGTCAG

5 HUMAN SEQUENCE - mRNA

GAATTCGAGGATCCGGGTACCATGGGGCTGGAGTGGGGACCGAGGCCCTGCTCACTCCCTGGTGGGCGGGCTTGGCCCGCTGCTG
GAGGCCACACCCACAGACTCTTGTGGCTATTTCCGGGAGACCATTCGGCGGGACATCCGGCAGGCGGGGAGCGGTTCACTGGGCC
ACAGCTGCGGCAGGAGCTGGCTCGCTGCAGCGGAGACTGGACAGCTGGAGCTGCTGAGCCCCGACATCATGAACCTTGTGTC
TCTCTACCCGCGATGTGTCAGGACTACTCGGCCATCATTGAGCTGGTGGAGACGCTGCAGGCCCTTGCCACCTGTGATGTGGCCGAG
CAGCATATGTCTGCTTCCACTACACTTTTGGCCCTCAACCGGAGGAACAGGCCCTGGGGACCGGGCGAAGGCCCTGTCTGTGCTGCT
10 GCCGCTGGTACAGCTTGAGGGCTCTGTGGCGCCCGATCTGTACTGCATGTGTGGCCGTATCTACAAGGACATGTTCTTCAGCTCGG
GTTTCCAGGATGTGGGACCGGGAGCAGGCCATCACTGGTATCGCAAGGCTTTTGACGTAGAGCCAGCCTTCACTCAGGSCATC
AATGAGCTGTGCTCCTCATTGCTGCCGGGCAGCACTTTGAGGATTCAAAGAGCTCCGGCTAATAGGCATGAAGCTGGGCTGGCT
CTGCGCCCGCAAAGGCTGCGTGGAAGATGCAGTATTACTGGGATGTGGGTTTCTACCTGGGAGCCAGATCCTCGCAATGACC
15 CCACCCAGGTGGTGTGGCTGCAGAGCAGCTGTATAAGCTCAATGCCCCATATGGTACCTGGTGTCCGTGATGGAGACCTTCTG
CTCTACAGCACTTCAGGCCACGCCAGGCCCTTGGAGGGCCACACGCCGTGCCCACTTCTGGCTCCACTTCTGTACTACAGCT
TGCCCAACCATTCAGACAGCCTGTGCCAGGCGACCTGTGGTGTGGTCTGGAGATGAACAAGGTGCTGCTGCTTGCCTGCAA
AGCTCGAGGTTCCGGGTACTGACCCAGTAAGCAGTGAACCTGTAGCCTGTGGAGCTGTAGACCCAGGACATTCCCTCCAGCTGG
ACCTTCCAGTCCGCTCCATATGCGGAGTCAGCGCCTCAAAGCGCGACGAGCGCTGCTGCTTCTCTATGCACTCCCCCGGCTCA
20 GGAGCTCCAGCTGTGCTTCCCCAGCGTAGGGCACTGCCAGTGGTTCTGGGCTGTATCCAGGCTGGGTGACGAACCCGGATTCCA
CGCGCCCGCGGAGGAGCGGAGGGCGGGGGAGATGTTGAGTTTGTATTAGATACAGGAGACGGGCGAGCGGCTGGTGTCTG
GGCAGGGCAGCTATGGGGTGGTGTACGGGGCGCGATCGCCACACGAGGGTGCATCGCCATCAAGGAGATCCCGAGCGGGA
CAGCAGGTTCTCTCAGCCCCGTGATGAAGAGATCGCTCTTACAGACGCTGCGCCACAAGAACAATAGTGCCTATCTGGGCTCAG
CTAGCCAGGCGGCTACCTTAAGATCTTCAAGAGAGTGCCTGGAGGACAGCTGTCTCTCTGTGCTGGGTGGGGACCC
25 CTGAAGGACAACGAGAGCACCATCAGTTTCTACACCGCCAGATCTGTCAGGGACTTGGCTACTTGCAGACAAACCATCGTGCA
CAGGGACATAAAGGGGCAATGTGCTGATCAACACCTTCAGTGGGCTGCTCAAGATTTCTGACTTCGGCACCTCCAAGCGGCTGG
CAGGCATCACCTTGCCTGAGACCTTACAGGAACCTGCAAGTATATGGCCCCAGAAATCATTGACAGGGCCACGCGGGTAT
GGGAAAGCAGCTGACATCTGGTCACTGGGCTGCACTGTCTTATGAGATGGCCACAGGTCGCCCCCTTCCACGAGCTCGGGAGCCC
ACAGGCTGCCATGTTTCAGGTGGGTATGTACAGGTCCATCCGCCAATGCCAGCTCTCTGTGCGCGAGGGCCCAAGCCTTTCTCC
30 TCCGAACCTTTGAGCCAGACCCCGCTCGAGCCAGCGCCAGACACTGCTGGGGGACCCCTTCTGAGCTGGGAAAGGAGC
CGCAGCCCCAGCTCCCCACGACATGCTCCAGGCCCTCAGATGCCCTTCTGCCAGTCCCACTCTTTCAGCCAACTCAACCACCCA
GTCTCAGACATTCCCGTCCCCCTCAGGCACCTCTCAGCACCCACCCAGCCCCCGAAGCGCTGCCTCAGTTATGGGGGACACAGCC
AAGCTCCGGGTGCCGAGGAGCTGCGGCCGAGGAGCTGCTCTCCGAGGAGAGTTCCGGGCTGAGCTGCTGACCCAGGAGAGC
AAGCGTCGGGCCATGCTGGCCGAGTATTGGAGCAGGAGCTGCCAGCGCTGGCGGAGAACTGTCACCCAGGAGCAGAAGCAAGAGCA
35 GGGGGCCCGTCTGGGCAGAAACCATGTGGAAGAGCTGCTGCGCTGCTCGGGGCACACATCCACACTCCCAACCGCGGCGAGCTCG
CCAGGAGCTGCGGGCGCTGCAAGGACGGCTGAGGGCCAGGGCCTTGGGCTGCGCTTCTGCACAGACCGCTGTTTCCCTTCCG
CTGCGGTGAAGCAGATCTCCGCAAGCGCCAGATCCGTCCACACTGGATGTTCTGTTCTGGACTCACTGCTCAGCCGTGCTGTGCG
GGCAGCCCTCGGGTGTCTAGGACCGAGGTGGAGAAGGAGGCGGTCTCACCAGGTGAGAGGAGCTGAGTAATGAAGGGGACTCCC
AGCAGAGCCAGGCCAGCAGAGCCCGCTTCCGGTGGAGCCGAGCAGGGCCCGCTCTCTGATGGTGCAGCTGAGCCTCTTGAGG
40 GCAGAGCTGATCGGCTGCGGAAATCTCGGCGGGGAAGGAACGGGAGTACAGGCCCTGGTGACGCGGCTCTACAGCGGCTGAA
TGAGGAAGCCCGACCTATGTCTGCGCCAGAGCCTTCAACTGCTCTTCAACGAGACAGGGCCTGGTGAGTGGCTACAGGAAC
TGAATGTGATTCAGGCACCATCCAAATGCTGTTGAACCATAGCTTCAACCTCCACACTCTGCTCACCTATGCCATCGAGATGAC
CTCATCTACCCGATCAGGGGAGGGATGTTATGCCGATCTGGAGGGCCATCTGGCAGAGCAGAGGATCTCACACAGCTCAC
CTCTGAGCCCTGAGAGCTGAATGAGGCATCATAGGCCAGACAGGCCCAAGGATGGATGAATGGAGAGGACAAAGGCAGCTTCTGA
45 CACACCAGCCCCAGGACTGGGGCGACTGGAGGAAGCCAGCGAGTGGGGCCAGGACTGGTTCAGTGAGAGAAACCAACACAG
GCACCAAGCACTACCAGACAAAGCGTATTAAACAGAACCTTTTGAATAAAAAAAAAAAAAAAAAAAAAAAAAA

HUMAN SEQUENCE - CODING

ATGAACCTGTGCTCTCTACCGGATGTGCAGGACTACTCGGCCATCATTGAGCTGGTGGAGACGCTGCAGGCTTGGCCACCTG
50 TGATGTGGCGGAGCAGCATAATGTCTGCTTCCACTACACTTTTGGCCCTCAACCGGAGGAACAGGCCCTGGGGACCGGGCGAAGGCC
TGTCTGTGCTGCTGCGCTGGTACAGCTTGGGGCTCTGTGGCGCCCGATCTGTACTGCATGTGTGGCCGTATCTACAAGGACATG
TTCTTCAGCTCGGTTTCCAGGATGCTGGGCACCGGGAGCAGGCCATCACTGGTATCGCAAGGCTTTTGACGTAGAGCCAGCCT
TCACTCAGGCATCAATGCAGCTGTGCTCCTCATGTGTCGGGGCAGCACTTTGAGGATTCAAAGAGCTCCGGCTAATAGGCATGA
AGCTGGGTGCTGCTGCGCCGCAAAGGCTGCGTGGAAGATGCAGTATTACTGGATGTGGGTTTCTACCTGGGAGCCAGATC
55 CTCGCCAATGACCCACCCAGGTGGTGTGGCTGCAGAGCAGCTGTATAAGCTCAATGCCCCATATGGTACCTGGTGTCCGTGAT
GGAGACTTCTGCTCTACAGCACTTCAGGCCACGCCAGAGCCCCCTGGAGGGCCACACGCCGTGCCACTTCTGGCTCCACT
TCTTGCTACAGTCTGCCAACCATTCAAGACAGCCTGTGCCAGGGCGACAGTGTGGTGTGGTCTGGAGATGAACAAGGTG
CTGCTGCTGCAAGCTCGAGGTTCCGGGTACTGACCCAGTAAGCACAGTGAACCTGTAGCCTGTGGAGCTGAGACCCAGGACAT
TCCCTCCAGCTGGACCTTCCAGTCCGCTCCATATGCGGAGTCAGCGCTCAAAGCGCGACGAGCGCTGCTGCTTCTCTATGCA
60 TCCCCCGGCTCAGGAGCTCCAGCTGTGCTTCCCCAGCGTAGGGCACTGCCAGTGGTTCTGCGGCTGTATCCAGGCTGGGTGAGC
AACC CGGATTCCACGGCGCCCGCGGAGGAGCGGAGGGCGGGGGAGATGTTGAGTTTGTATTAGTACAGGAGACGGGCGA
GCGGCTGGTGTGGCAAGGGCACGTATGGGGTGGTGTACGGGGCCGCGATCGCCACACGAGGGTGCGCATCGCCATCAAGGAGA
TCCCGGAGCGGGACAGCAGGTTCTCTCAGCCCTGCATGAAGAGATCGCTCTTACAGACGCTGCGCCACAAGAACAATAGTGC
65 TATCTGGCTCAGCTAGCCAGGGCGGCTACCTTAAGATCTTATGGAGGAAGTGCTGGAGGAGCCTGTCTCTCTGTGCTGGTGT
GGTGTGGGGACCCCTGAAGGACAACGAGAGCACCATCAGTTTCTACACCGCCAGATCTGACGGGACTTGGCTACTTGTGACGACA
ACCACATCGTGCACAGGGACATAAAGGGGCAATGTGCTGATCAACACCTTCAGTGGGCTGCTCAAGATTTCTGACTTCGGCACC
TCAAGCGGCTGGCAGGCATCACACCTTGCCTGAGACCTTCAAGGAACCTGTCAGTATATGGCCCCAGAAATCATTGACAGGG
CCCACGCGGGTATGGAAAGCAGCTGACATCTGGTCACTGGGCTGCACTGTCTTATGAGATGGCCACAGGTCGCCCCCTTCCAGG
AGCTCGGGAGCCACAGGCTGCCATGTTTCAGGTGGGTATGTACAAGGTCCATCCGCCAATGCCAGCTCTGTGTCGGCGAGGCC
70 CAAGCCTTTCTCTCCGAACCTTTGAGCCAGACCCCGCTCCGAGCCAGCGCCAGACACTGCTGGGGGACCCCTTCTGCGAGCC
TGGGAAAGGAGCCGAGCCCCAGCTCCCAAGACATGCTCCAGGCCCTCAGATGCCCTTCTGCCAGTCCCACTCTTTCAGCCA
ACTCAACACCGTCTCAGACATTCCGTCGCTCAGGACCTCTCAGCACCCAGCCAGCCCCGAGCGCTGCTCAGTTAT
GGGGGACCCAGCAGCTCCGGGTGCCGAGGAGCTGCGGCCGAGGAGCTGCGTCTCCGAGGAGAGTTCCGGGCTGAGCTGTCT
75 GCACAGGAGAGCAAGCGTCCGGCCATGTGTCGCGCAGTATTGGAGCAGGAGCTGCCAGCGCTGGCGGAGAACTGTCACAGGAGC
AGAAGCAAGAGCAGGGGGCCGCTGTGGCAGAAACATGTGGAAGAGCTGCTGCGTGCCTCGGGGCACACATCCACACTCCCAAC

CGCCGGCAGCTCGCCAGGAGCTGCGGGCGCTGCAAGGACGGCTGAGGGGCCAGGGCCTTGGGCCTGCGCTTCTGCACAGACCGCT
GTTTGCCTTCCCGGATGCGGTGAAGCAGATCCTCCGCAAGCGCCAGATCCGTCCACACTGGATGTTCTGTTCTGGACTCACTGCTCA
GCCGTGCTGTGCGGGCAGCCCTGGGTGTGCTAGGACCGGAGGTGGAGAAGGAGGCGGTCTCACCGAGGTGAGAGGAGCTGAGTAAT
5 GAAGGGGACTCCCAGCAGAGCCAGGCCAGCAGAGCCCGCTTCCGGTGGAGCCCGAGCAGGGCCCCGCTCCTCTGATGGTGAGCT
GAGCCTCTTGAGGGCAGAGACTGATCGGCTGCGCGAAATCCTGGCGGGGAAGGAACGGGAGTACCAGGCCCTGGTGACGCGGGCTC
TACAGCGGCTGAATGAGGAAGCCCGGACCTATGTCTGGCCCCAGAGCCTCCAAGTCTCTTTCAACGGACCCAGGGCCTGGTGACG
TGGCTACAGGAAGTGAATGTGGATTGAGGCACCATCCAAATGCTGTTGAACCATAGCTTCACCCCTCCACACTCTGCTCACCTATGC
10 CACTCGAGATGACCTCATCTACACCCGCATCAGGGGAGGGATGGTATGCCGCATCTGGAGGGCCATCTTGGCACAGCGAGCAGGAT
CCACACCAGTCACCTCTGGACCTGA

Table 5

MOUSE NOMENCLATURE	
ICSGNM	Fosb
Celera	mCG4848
HUMAN NOMENCLATURE	
HGNC	FOSB
Celera	hCG20725
MOUSE SEQUENCE - GENOMIC	
CTCACTCCGCCAGTCTGAAGCATCCGGGCTCTGTCTGTGAAACAGTCCGCGAATCGGGAGGGTCTACCCACTGGCCCCAGCACCCCC	
TCCTCCCAAGGCCCCCATGTCTGTCTTCATGTGACCAGGGCTGGGCCGAATCTCTGAGCAGACAGAGAGAAGCATGGTGTGACC	
GCATGAGTGGAGTGAGTTCTGGGGACAGTGCCCAAGTTGTGCGATAGACAGCAGATTCCGGAGGACCACTGTGCATGTGTGTGTGT	
GTGTGATTTGGTTTGT	
GACAGACAGACAGACAGACAGACAGACAGAAAGAGAGTTGTGTGAGGACCACTGTGCATGTGTGTGTGTGTGTGTGTGTGTGTGTGT	
GT	
AGAGACAGACAGACAGACAGACAGACAGACAGAGAGACAGACAGAGAGACAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG	
CTCCAGGTGATCTGGGAAGCTTGTGAATGTGAAAGTGCCCTGTGGGTGGCTTCACTCTGGCAGAGGCATTCTGCCTCCTGTATAT	
TAACATGTGTGCTCAGACAATCCACTCAAAGATCTCTGGGGTGCAGCTGATAGAGCAGCTTACTAGTGTGCAAGGCCGTG	
GGTGCAAAACACCCAGAACTACAATCCAGAACTCTCTCTGCGCACTGAATCGACTTCTCATTTGTTTCTTGTGTTCTTTT	
GACGGAGTCTAACATTGTCCGATTGCTTCAAACCTTATAGCGAGGAAGATCGATGGCAATCTCTCTGCTCCACCTTCTGAGTG	
CTAGGATTGTCAGGCATGTACCCTCATGCCAGTTGAGACAGTATCAGTGATTGAACCCAGGGCCTCACGCTCCTGGAGAAGCCCT	
GTACCATGGAGCTACAAGTCTAGTTCCTTTCTGTCTTAAAAAAAATAAAAAAGCTGGGTCTTCTTATAGCCAGGCTGGCTTTG	
TACTCCCATCTCTCTGCTCAGCCTCCCAAGTGTCTGGGATGATAGGCTTATGGCAGGCCATGATAGCACTACAATTTCCAGAG	
TTGCTGTCTCTTTGTCAGTGTACTATGCTTGTGAGGGACAGGCTCTGAGGGTCTGCTTGTGATCACACCTGAGGACCTGTTTGC	
TGGGAGTCTGTCTCCCAATTTCTTTGCCAGGCTGGAAGACACTGACACACCCACCATGGTGACAGTACCCATGGACTTAAATGGTGT	
GACTCCCTCTGCTCTAATGGGAGGGTCTCAGTGCCCGTATCTGCTGTTTCTCAAATGGGGTAGGTAATACAGAGATAGGAGGGCT	
GACACAAACATATCAAACACCAAGATAGCAAAGGCTAGAATGAGACCCTGTCTCAAGCTTTCCCATAGAGAAGGGAGTGTATAA	
TTGCACCCCACTCAAGACTGTTGGCCATAAACAAAGTTGTATGGAAAAATGTTTACAAAGTGCTTGGCAGATCCAGGGGTGGTGGC	
GCACACCTGGATTCTCATACTGGAGAGAAGACCCAGGAAGATTAGGGACGGTCCAGTCAGGCCTACATATTGAGACCTTATCTC	
AAAAACAAAACACACACACACACACACACACACACACACACACCTCAAACCTCTGGAAGTTCACATTTTGGGAAAGGC	
ATCTGAATGGTAAAGTGTAGGGATTAAAGAGTAGAGACTAGAGTCCCTCCATGGGACCGAGATGTAGAAAAAGAAAAAGAGAGCT	
TGCTAAAGCAGGCCAGCCTAAGGGCAGACTCTGAAAGGACTTGCTCCAAATGATTGTTGAGGGTGGAGGACTTAAGAACTGGA	
ATTGTGGGAAAAACTCTCGGGGAATGACAAAAGCCGGTTTGCAGGTTGGTGAGATTAGAAAGTAATGGCCACAATATAGGGCACA	
TATACAGGCTGTGCTTGAATCTGTAATCTCTCTGCTCAACCTCCCACTATTATAGGTATATGTCAACAGCTGGATGCTTTTGC	
TGTCTTGTGTTCTTTCTGTGCCCCAGGGCTTCAGTGAATAGGGATGGCTGCCGATTAAATAACTGAATTGCTAGCAGGGTGGGTGAG	
TCAGGGCTTTAATCCAGCCTTCAGGAGGAGAGGCACACAGATCTTTGTGAGTTCGAGGCTAACCTGGTTAACAGAGAGAGTTCC	
AGGACAGTCAGAGCTACACAGAGAAACCTTGGCTCAAAAACAAACAAATATCTGAATGGCTGATTGAATGACTGGGCAGATGGAC	
AGATAGACAGATGGACATGTACGATCCACAGACATGTACGATCTTTGGGATGGTGGGGAAGGCTTGGTAGCTAACACAGGCTGGCT	
CAAGACCTGTCTCTGGGAACCCCTTTCTTCTTGTATCTCTCAGCTCTGGGTCTGAAGGGTGTGGAGTGGGCCGGGAAGGGAGTG	
TCAGGCTCAGTGGCTGCTTGGCTTGGATTCTGGCCAGAGTGTCTGGAGGAAGAAGAGGGTATCTCGGCATCTGAGTCACCTTAGA	
GAAACCTTAGCCACATACCTGACTCTGACATCACACAACAGGGCAACCTTGGTGGCCGAGACAAAGGACTGAATCATGGACTG	
AAATCAGTCACCTTGGGCATGGGCACGTGGCCGCTAGTGACCCCTGAGACACCCCGAGTGGCTGTCTGGCTGTGTGGGCATGCA	
AACCACATCAAGGTGAGTAAAGGCTCTCAGCCTGAGTCAGGGACAGGGTGGCCACTGCCAGAGACCACCGCACAGCATCTGCA	
GGACAGGAAGAGAAAGTTGAGGGAGAAAAGGCAGAGGGTAGGCCCCCACTCAGGGAGAGGGAAGTGCTTGGGAGAAAAGGGGAAGC	
TGTGGCTTGGGCCAGTAGCCTGGTGACCTGTGGCTGGGATGTGGAATGGGTCTTAGTGTTCGCGACAGAAATGGCGAAGTTGCA	
AGCGAGGCTCAGAGGCAATGGAGTCAGCAGACAATGGGCTCTTACATTTGCACACGACAGGCACAGGCGCACAAAAGCCAGCGTGG	
GAGCCCTACCTCTCCAGCCACCCAGAGCTACAGCTTGCCACACACACAAGACTGTCCCAAGAACTGCTCCCTTACCTTACCTTAT	
TAAGTGACATCCGTAATCTCATTGTGAAGATTGCACTCTCGGTATTTGATGATCTCATTGTATGAATAACTTAGACATTG	
CAGTGCCAGGCACTGTTGTAGACTATTAGCTGTGCTAGGGATTGAACCCAGGGCTTCTTGCACTTCTGGGCAACATCTCTGCCACT	
GAGCTTGTCTCCAGACCCAGTGGCCATGGTTGTGCCAGCCCTGTTTATATGTAATCTGAGACAGGCTCAGCTCAGTAAATG	
CCCAGAGACCCCTGAGCTCACTCTATTACCAGCCTTGAACCTCACTGATCTTCTGAGGGATTGTAGGCATGACTAGCTAGACAC	
AGCTAAGTATCTGTTAGAGCGTGTATGTGTACCTTGGGGCAGACATCTGTCCAACCTGTATATGTCTATACATTGTTAGGTTTCAA	
CAATGGCTGAGGTGCCCTATTAAACATATCAAGAGGACCTGGCCCCCAATTTCTCCCTGCAATAACTCAGCTCCTATATGCCCTCC	
TGGCTGGCATAACCCACCGCTATGCTGAACCTTCCAGCCAGGGGTGGGCTGTTCTATCCCTATGTAATCCAATATTTTAGCT	
CTCCCCCTCTCTTGTACCTTAAGGCTGCACCTGGCTCCCATGGCTCCCTCTCTCTCCCCACAGGCTCAGGGTTAAGTCGACT	
CTGGACTATCTAGAGGTCCCTGCTCTGGCTATGCTCTCCACATATCTATAATAACTCTCTCTGCACTACCTAGGAACAGTCA	
TGTTCCCTTCTCTTCTCTTCTTAATTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTT	
TAAAAATATACAGCTAGCCAGGCATGGTGATGCACACTTTAATCCAGCACTCGAGAGGAGACACAGGTGGATCTCTGTGAG	
TTGAGACCCAGCCTAGTCTACAGATTGAGTTCAGGCCTGTCTGGCCTATACAGTGAGATCTCAAAAAGAAAAATGTACACACAC	
TACCCCTTCAAGTCAGAAGACCTGAGACACAAGCCCATCCATCGCCGGGAGCATGGGAAAAGCAGGTTGTTACAAATGCCCTGG	
AGTCAGGTCTGACACTCACACACAAGTCCCTGCCACCACTGTATCCAGCAGCTACATTGGAAGGATCAGAGAGGTCCAGATACT	
GTGCTGCCCTGTGACACTTATGAATGAAGACTGTAATGGAGGCTGTATGTCTGTAATCCAGCACTCGGGAGGCACTCAGGAGGCA	
AGGAGGATTTGGAGGAGTTAGCTGGAGGCCAGCTATGCTATAGAGTAAGACTGCTTCAAAACAGAGAAATGAGAACTGAAAGAT	
TGCTCAGTGGGTAGAGGCGCTTGCTGCAAGTCTAAGGAAGTGAAGTCAATCTCTGACATTTGCATGATGGAAGAAAAGAACTCC	
TCAAGGTACACACACACACACACACACTCAAGAAAGTAAAAATACTTTTAAATTTAAAGAAACAGAGAACTTGAACACATG	
GTGGTCTGCGATGTGGCTCTGAGTAACTGCTGCTGAGTATGTAGTCTGCTGTTTGAACCCACCTATATACAGACAGGTG	
TGGTGATACAAACCTGTAATTCAGCACTGGGGCTGGAGCAAGACGATGGGAGAAGTTCTAGGTGGCTCATCTTGGCTAAAAA	
AACATAGCCTGAGCTACCTGACACTGGTGTCTAGTGTGAGCTATCTGAGACTCTGCTCACAAATAATTAAGTAAAAATATGTTGAG	
ATTCTAGCAGCAGCACCTACAGATTGCTGTCTGTGCTGGGACACAGGCGAGCTTCACTAACCTGTATGGGAACACTCTGGGA	
GACGACATCTGTTTGAAGGCGCTGGCTCATCTGAGACCAAGCGACTTCAGGAGCCAAGTAGACCAAGATCCGTGTGCTTGA	
CAGTGGGAAGGGCATAAGAACTCAGGAAGTGAAGCAGCAGGAGATGGGAGGCTGGGACAAGGGACCACTGACAGACACCA	
TACATCATACCTCTTGTCCCTCTGAATCTCATGGGCACCCCTCTGGGAGGACTCCAGGACTGCAAGCAAGGTTAACTGAGTC	
AGCCAAATCAACCTGGCCTAGGGGTGGAGGCAGGGGTCTATCAGCGCAGGAGACAGGACAAGGACACTCATGTATTGCCATA	

223

224

225

25

78

226

MOUSE SEQUENCE CODING

5 ATGTTTCAAGCTTTTTCCCGAGACTACGACTCCGGCTCCCGGTGTAGCTCATCACCTCTCCGCCGAGTCTCAGTACCTGTCTTCGGT
GACTCTCTTCGGCAGTACCCAGGACCGCGCCTCCAGAGTGCGCCGGTCTCGGGGAATGCCCGGCTCTTCTCGTGCACACGG
TCACCGCAATCAACAACGAGCCAGGATCTTCACTGGCTCGTGCAACCCACCTCATCTCTTCATGGCCAGTCCAGGGGCAGCCA
CTGGCTCTCCCGAGCTTCGCTGTGTGACCTTTATGACATGCCAGGAACGACTACTCAACCCAGGCTGAGTGCCTACGACACTGG
CGGGCGAAGCGGAAGTGTGGGCCTTCAACGACGACAAACCACTGGAGCTGTGTCTGCCCTCGCAGCAGAGCCAGGCTAGAA
GACCCCGAGAAGAGACACTTACCCAGAAGAAGAAAGCGAAGGGTTCGAGAGAGCGGAACAAGCTGGCTGCAGCTAAGTGC
10 AGGACAGCTCGGAGGAGCTGACAGATGCAGCTCAGGCGAACTGATCAGTTTGAGAGGAAAGGAGCAGAGCTGAGATCGGAGAT
CGCCAGCTGCAAAAAGAGGAAGGAACGCTGGAGTTTGCTGTGGCCCAAAACCGGGCTCGAAGATCCCTACGAAGAGGGGC
CGGGGCCAGGCCCGCTGGCCGAGGTGAGAGATTGTCAGGGTCAACATCCGCTAAGGAAGACGGCTTCGGCTGGCTGCTGCCGCC
CCTCCACCAACCCCCCTGCCCTTCAGAGAGCCGAGAGCGACCCCCCAACTCGAGCGGCTCTCTCTTTACACACAGTGAAGTTCA
15 AGTCTTCGGGACCCCTTCCCGGTGTAGCCCTTCGTACACTTCTCGTTGTCTCACTGCTCCGCGAGGTCTCGCGTTCGCCG
CGGCCAACGCAACGCGGAGCAGCAGCGTCCGACCCGCTGAAGTGCCTCCCTTCTGTCTGTAA

[illegible]

228

229

TGCAATCCACGCTCTTTGGAGGCCGAGGTAGGAGGCTAGGAGTTCGAGAACAGCCTGGGGCAACATAGTGAGACACCCCCACCC
 CAACCCATCTCATTATGTTGAGAAAAAAGAGGATCTTGAGAACTTGACAGCAAACTACTAAAGACCACTCAGGCTA
 GGAATGAGGCGTCATCTTGGATTTTTTACAACTACAACACAAAAACAATATTTTACACTGAAGATGTGTTCTTTTGT
 5 CCATATGACCACTATTTGGGCAACCAAGACTGACTGAAGCAAAATATGACCATTTTTTTTTTACATAGAGTGGAGCCAT
 CCCCATTGCAAACTCTAGCCGTCTCTTATTGTCATAACAGCAAGTCTCTGGGAATTGAGGTGAGGGTCCGCTCAGAC
 GCTTTGGTAAATCAATAAGCAAGGGAATTTGTCATGTTGGAATCCATTATTAATCACTCAAAAAATGTGCTAAGCACCTACCC
 AACTGTGCTGGGAGTTGGGACACTATAGGACTGAGCCTCAGGTCTTGCCCTCTGGGGCTCAGTCCATTGGGGGACACAC
 CGTTGCCAGTCAGGACAACTAAAGTGGATTGGGTTGGGAAGCCCATGGGGCTAGGGAAGCAAGCAGGGGACCTAGCTTGG
 10 CTGGGAGTGGGAAAACTTCTGCGGAGGGGACAGCTGAGCTGAGTCTTAGAGGAGGATAGAGATATAGAAAGAAATAGAAAA
 AGGCCAAGGCCAAGAAAAATAGCACAGCCATAGATCTGTTGGTGGGAGAGGCTTGATACATTGAGAACGCTTAGAGGGTCCGGTG
 CGATGGCTCATGCTGTAATCCAGCACTTTGGGAGGCCGAGGTGGTGGATCACCTGAGGTGAGGCAATCAAGACAGCTCTGGCC
 AACGTGGCGAAACCCGCTCTACTAAAAATATATATATATATATACAAAAATTAGCTAGGCATGGTGGTGGGCACCTGTGATC
 CCAGCTACTCGGGAGGCTGAGGCAGGAGAAATCGCTTGAACTGGAAAGTGGACATTGCACTGAGCTGAGATTGTGCCACTCAGT
 15 CAGCTGGGCAACACAGCGAGACTCTGCTCAAAAAAAGAAAAAGAAAAAAGAGAAAACTCAGAGATTCTGGGAGTCTGGGAGC
 TGGAAACCAAGGTTGGAGAGAGGGGTTAGTAGAGACAGATTCTGCAGGTACTATAATGACATTCCAGGCTAAGGAGTTAGAT
 CTTTCTTTCAGGGCACTGGGAGCTATTGCAAGTTTGAACAGCAGAGGGGCGAGGGCAGGTTGTGATTAGGAAAGACCCCTCT
 GGGCCAGACTGAGCGTGAAGGGAGAGGAGTGAAGTGAAGAGACAGGAGGAGTGGGTTGGGAGCCTGCAGGGT
 GGGGTGAGGGAGGATCCAGAACAGGGCCAGGGACATGGGACAGAGAGGAGGGAGGATTGAGGAGACCTCGGAGGACAGCAG
 20 TTGGGCTTGGTGAAGCAGCGGCTTGGGAAGGAAAAATACAGGGCAGTAATAATAGCATGGGTCAAGTGGTCTGAGTGAGCTGGGA
 GTGGTGGCACGCACTATGGTCCAGCTACTCAGGAGGCTGAGGTGGGAGGATTGCTTGAGCCTGGAAGTTGAGGCTGCAGTGAG
 CTATGATCGTACCGCTGCACTCCACTTTCCGTGACAGAGTAAGACCTGCTCTCAAAAAAAGAAAAAGAAAAAAGAAAAA
 ACCTGCTATGAGTTAACTGCTCTCAAGGAGCAGTTTAAAGTAAATTAAGAAAAAAGAAAAAAGAAAAAAGAAAAA
 AAGAAAGAGAGAGAAAAAAGAAAAAGGCTGGGTTGCCTTGGCAACAGACTTCATCTCCCTGAGCCTCCATTCTCATCTGTAG
 25 AATGGGGCTGTAAAGAGGAGTTGCAAGGCTTGTGATGCCAGCAGTAAGTGACAGTACGGTGCAATTATCATTTCCCTCATCA
 TCTTTATTGGGTCAGCCTGAACCTCGATATCCATAATATCAACCCCTCTTCAAGGCTGCGCTAATGTTCCCATGACAC
 CCGAGCAGCTCAGCTCTCTTATGAGAGGCTCAGTTTCTATTCCCTTTCAGGCGCTTATCCCTTTGTAGTTGTTAATGAT
 GTGTAATACATGATGGCTTAATGTTTCTCCCACTGGCTGACTGACAGGAGACCAAGGCGAGGCTGTCAACCACTG
 30 CGCTCTCAGCAATGCTTGTGTTGATGAGTGAATGACAGATGAACAAATGGGCAAGTATTGACTGATTAATCAGGCATGCGTGA
 TTAATAAATAGTGAAGCAACGACTGAATGATGAAGCAATGAAGGGAGAGATCTAGGATAATTTCCAACTGCCAATATCCCA
 GAACCTGGGTAGATGACTTTTCTCCGCTCTTTGGAGTGGGTTTATACTCGGAGGGGAAATAAGTAACGCAATCAGAGATCG
 GAGTGACAGAGAATGAGTTTGGATGCGGAAGGCGCAGCGACCTCTCAGGTGACGGCTGGAGGAGCGCTCCCGGGCAACAAGC
 35 AAAATAAGTCCGGTTCGATAAGTAAGATTCAAGGCGCTAGTTACTACCGCCGAAAGGTGGAATGAACCACTCTGCTCGCTAGAC
 AGCTACAGGTTTGAAGCCTGCACCCAGACCACTGAGGATCATCGGGCAGGACAACCTTCTCCCGCGAGCTATATAAGGATCG
 CAAAGCTTTCTTTAGAGTTATGGTCCGCTCTTTGGAAAGGTGAGATGGTGAATCTCAAGGGCTAATAGTTCTCCCACTC
 ATTTATCGTGAGAGATGCTTGTAAACGTTGCTTCACTTCATATAGTATGAATCATCTCGCTCCCAACCGCTCTATTAC
 40 ATAGCGCCACGCACTTCTGGGAAGCAGCGTTGAGCACCTGGCAAGCTGTTAAAGGGCCAGGACCCCTTTTCCAAATGAAAAG
 TCACTCTTTTAAAGAGGAGAGATTATGATTCCGCTTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT
 GTGAGTGGGTTCTGTTAGAGTCTGATTCAACCTGGCCCCAAGGCGCTGAGCAGGCGCTATAGGGCTGGTGACACCTGCTGT
 TCTTTTATGGAATTGCGTAGGCGGATGGAGCTCCGCTTCACTCAACGTTTATTGAGCGTCTACTGAGTCCAGGAATGCTCTCG
 45 GTGCTGGTGACGACAGACATCTGTCGCGATGAGTTTAAACACTAGACATAACCAATTTCTGCACTTGGCTTGGGAGAGA
 AACTGAGACAGACTCAGAAACGATAGTACCATATCCGTTTAAACAGCCCATCACTTAGGGAATCGAATCTGTGTTACAATT
 TTTATTACAAAAAGGTGATTCTTTTCTTAAATTTTACATATTTAGGAGGTACAGGTGCGGATTCTACATGATATGTTGAT
 TGCATCGTTGGTGAATCTGGGCTTTAGGTGATCTCATCAGCAAAATATTCAATATTCTAAGTCACTGATCTTTGACAACTACC
 50 ATTCTCTGATGAACTCTCCATGACTTCCATTTAGAGTAAAGTCAAAGTACTCACCTGCTTTACAAATCCCTGTAATCCA
 GCGCTTTGGTCCCTCTGACCCCTGTCTCATACTCTCTTCCCTTGGATATTATGGATTAGGACACAGATGCTTGTCTGCAC
 ACATGGTCTGCTACACACAGGAGCTTTGTGCTTGGCAGTCCCTAGCTGATCTCTCTTACATGTTCCCTGATCTCCTGATCCC
 GCCTCCCTTCACTCTGTCATCTGATCAATGTCATACCAAACTCACTGAGTGACGAGCACTCAGTGGGGCTTCCCTGATCCC
 AGTTTAAATAGCGAGTGGCGGCGCGGCGGCTAGCTCAGGCTGTAACCCAGCACTTTGGGATGCCAAGCGGGTGGATCAGGA
 55 GATCAGGAGATGGAGACCATCTGGCTAACACGGTGAACCTTGTCTCTACTAAAAATACAAACATTAGCTGGGCGGTGGCGG
 CGGCTGTAGTCCAGCTCTCGGAGCCTGAGGCAGGAAATGGAGTGAACCCGGGAGGCGGAGCTTGCAGTGAGCTGAGATTGC
 TCCACTGCACTCCAGCCTGGGGACAGAGCGAGGCTCCGTCTCAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
 GGCTCAGGGCTGTAATCCAGAACTTTGGGAGGCCGAGGCGGCTGGATCACTGAGGTGAGGTTGAGGCGAGCTGGGCAAC
 60 ATGGTGAACCCGCTCTCCAGAAATGATACAAAAATAGTCAGCAGATAGTGGCTCAGCGCTGTAATCCAGCTCTGGGAGTTG
 AGGACAGGAGAACCGCTTGAACCGGGAGGAGAGGTTGAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT
 65 AAAACTCCATCTCCAAATAAAGTAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
 CCCTGCTAGACATTTCCCACTCTGATCACCACCTGCCATTTCTGTGCTATTGCTTACCGTCTGTCTGCTTCTGTAGAAAT
 ATCAGCACCATGAACTATGCACTTTATTTTGTATGCTGTATCTCTAGTGCTTAAAGTGTGTTGAGAACATAGCAGATGTT
 CAGTAAATGTTTGTGGAATGAATAAAGAAATATCATCACTGCTTTTTTTTCACTTCTTCCAGACAGGATCTTACTTGTCACCC
 70 AGGCTGGAATGCACTGGCGCAAAACGGCTCACTGAGCCTCGACCTCCCAAGCTCAAGTGATCTCTTGCCTGCTCTCTGCTGGG
 ATGACAGGCATATACATCAGGCCAGCTAATTTAATTTTTTGTAGAAACAGGGGCTCACTTGTGTCAGACTGGCCTCG
 AACTCTGGCCTCAAGTGATGCTTCTGCTTGGGCTCCTAAGTGCTGGAATTTACGCGTGAGCCACAGCCTGGCCTCACTAT
 CTTCTTTCAGCCTCAGTTTCTCACTTGTATAACAGACTAGTACAATGATCTCACTGGAGAAATCATGATATAAAATCTGAC
 75 ACTGGCTGAGGCACTGGGAGGAGCTCAGTAAAGGCTGTTCTGCTGGGACGGTGGCTCACACATGTAATCCAGCACTTTGGGA
 GGCGAGGTGGTGGATCAGGAGATTAGAAGTTCCAGACCATCTGGCAAGCATGGTAAAACCCCATCTCTACTAACAATTCAAA
 AAGTAGCCAGGCATGGTGGCTCACACTGTGATCCAGCTCACTCTGGGCGACAGAGCAAGACTCTGTCAAAAAAAGAGTTT
 GGTGCACTGAGCCAAAGATTGTGCACTGCACTCCCTCTGGGCGACAGAGCAAGACTCTGTCAAAAAAAGAGTTT
 TTTTGGCTGGAATTACAGGCGCTGCCCCACACCTGGCTAATTTTGTGTTTTTGTGTTTTTGTAGGAGAGACGGGTTTCAACATG
 TTCACAGACTGGTCTTGAACCTGACCTCAGGTAATCCAATGCTCAGCTTCCAAAGTGTGAGATTACAGGCGGAGGCCAC
 TACACTTGGCCAAATAAAGCGCTTTCAGTCTTCAATCTGTTTGAAGTGGAGGCTTTAGTCACTCCAGCCCAAAATCTCAATC
 80 AGACCTCTTCCACCACTTTTGTGATAGATCAATAACATTTTGTCTTATGGGAGTTTAACTAAGAGTATCTTTAGAAAGTTT
 GGACAGGCGCTGTAATCCAGCACTTTGGGAGGCCGAGATGAGCGGATAGCTTGAAGCCAGGAGTTAGAGCAAGCTGGGCAACA
 TAGTGAGACTCTGTCTCAAAAAAAGAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
 CAGATTCAAGATATATCCCTAAACCTCTTGTGTTTAAATAGATAGTGTGCTAGGCACCTCTGTATACAAATCTGAGGATGT
 85 AAGGCTCTCTTGGAAACCGTTATCTGCTCTCAATATGATGACGTGTGATGACGAACAGTGAGTTTCTTTTCTTGTGTTCTT
 TTTTGTGTTTGTGTTTGTGAGACGAGTCTCGCTCTGTCGCCAGGCTGAGTGTAGTGGCGGATCTTGGCTCACTGCAAGCTC

231

5 TCTCGGCCCTCTGATTGTTCCCGATGGTCTCTCTCCCTCTGTCTTTCTCCTCCGCCTGTGTCCATCTGACCGTTTTCACTTGTC
TCCTTTCTGACTGTCCCTGCCAATGCTCCAGCTGTCGTCTGACTCTGGGTTTCGTTGGGGACATGAGATTTTATTTTGTGAGTGA
GACTGAGGGATCGTAGATTTTACAATCTGTATCTTTGACAAATCTGGGTGCGAGTGTGAGAGTGTGAGCAGGGCTTGCTCCTGCC
AACCACAATTCAATGAATCCCCGACCCCTACCCCATGCTGTACTTGTGGTTCTCTTTTGTATTTTGCATCTGACCCCGGGGGG
CTGGGACAGATTGGCAATGGGCCGTCCCTCTCCCTTGGTTCTGCACTGTTGCCAATAAAAAGCTCTTAAAAACGC

HUMAN SEQUENCE - CODING
10 ATGTTTCAGGCTTTCCCGGAGACTACGACTCCGGCTCCCGGTGCAGCTCCTCACCTCTGCCGAGTCTCAATATCTGTCTTCGGT
GGACTCCTTCGGCAGTCCACCCACGCGCGCGCTCCAGGAGTGCAGCGGTCTCGGGGAAATGCCCGGTTCTTCGTGCCACGG
TCACCGCGATCACAACCAGCCAGGACCTCCAGTGGCTTGTGCAACCCACCTCATCTCTTCCATGGCCCAGTCCCAGGGGCAGCCA
CTGGCCTCCAGCCCCCGGTCTGACCCCTACGACATGCCGGGAACAGCTACTCCACACAGGCATGAGTGGCTACAGCAGTGG
CGGAGCGAGTGGCAGTGGTGGCCCTTCCACCAGCGGAATACCACTGGGCTTGGGCTGCCCCAGCCGAGCCCGGCTTAGGA
GACCCCGAGAGGAGACGCTCACCCAGAGGAAGAGAGAAGCGAAGGGTGCAGCGGGAACGAAATAAACTAGCAGCAGCTAAATGC
15 AGGAACCGGCGAGGGAGCTGACCGACCGACTCCAGGCGGAGACAGATCAGTTGGAGGAAGAAAAAGCAGAGCTGGAGTCCGAGAT
CGCCGAGCTCAAAAGGAGAAGGAACGTCTGGAGTTTGTGCTGGTGGCCACAAACCGGGCTGCAAGATCCCCTACGAAGAGGGGC
CCGGGCCGGGCCCGCTGGCGGAGGTGAGAGATTTGCCGGGCTCAGCACCGGCTAAGGAAGATGGCTTCAGCTGGCTGCTGCCGCC
CCGCCACACCGCCCTGCCCTTCCAGACCAGCCAAGACGCAACCCCACTGACGGCTTCTCTTTACACACAGTGAAGTTCA
AGTCCTCGGCGACCCCTTCCCGTTGTTAACCTTCGTACACTTCTTCGTTTGTCTCACCTGCCCCGAGGTCTCCGCGTTCCGCG
20 GCGCCCAACGCACCGAGCGGCAGTGACCAGCCTTCCGATCCCTGAACTCGCCCTCCTCCTCGCTCGGTGA

Table 6

[illegible]

234

235

236

MOUSE SEQUENCE - mRNA

75

CACCGATGACTACATCGGCGAGAATACCACGGTGGACTACACCTGTACGAGTCGGTGTGCTTCAAGAAGGATGTGCGGAACCTTAA
 AGGCCTGGTTCCTGCCTCTCATGTATTCTGTCTATCTGCTTCGTGGGCTGCTCGGCAACGGGCTGGTGATACTGACGTACATCTAT
 TTCAAGAGGCTCAAGACCATGACGGATACCTACCTGCTCAACCTGGCCGTGGCAGACATCTTTCTCTTAATTCTTCCCTTCGTG
 GGCTACAGCGAAGCCAAAGTCTCGGATCTTTGGCGTCTACCTGTGTAAGGGCATCTTTGGCATCTATAAGTTAAGCTTCTTCAGGG
 5 GGATGCTGTGCTCTCTATGTCATCAGCATTGACCGCTACGTAGCCATCGTCCAGGCGGTGTCGCGTCTACGCCACCGCGCCGCGTG
 CTCTCATCAGCAAGCTGCTCTGTGTGGGCATCTGGATGCTGGCCCTCTTCTCTCCATCCCGAGCTGCTCTACAGCGGCTCCA
 GAAGAACAGCGCGGAGGACACGCTGAGATGCTCACTGGTCAGTGCCCAAGTGGAGGCTTGATCACCATCCAAGTGGCCAGATGT
 TTTTGGGTTCCCTAGTGCTATGCTGGCTATGAGTTTCTGCTACCTCATTATCATCCGTACCTTGCTCCAGGCACGCAACTTTGAG
 CGGAACAGGCCATCAAGGTGATCATTGCCGTGGTGGTAGTCTTCATAGTCTTCCAGCTGCCCTACAATGGGGTGGTCTGGCTCA
 10 GACGGTGGCCAACTTCAACATCACCATAGCAGCTGCGAAACAGCAAGCAGCTCAACATTGCCATGACGTACCTACAGCCTGG
 CTTCCGTCGCGTGTGCGTCAACCTTTCTTGTATGCTTCATCGGCGTCAAGTTCGCGAGCGACCTTCAAGCTCTTCAAGGAC
 TTGGGCTGCTCAGCCAGGAACGGCTCCGGCACTGGTCTTCTGCGGCGATGTACGGAACGCGTCCGTGAGCATGGAGGCGGAGAC
 CACCACAACCTTCTCCCGTAGGGGGCTCCCTGCGCGGACTACAAGGACCTCTCCAGGAGCTTAATGTGGTGACACATGCAC
 AGACTCTCCATCCACCGAATTGCTGCTGAGGGAAGAGCAATTCTGGCCAGTCAGGTTGACATGAGGACCTTAAGAACTGCTTAAACC
 15 CCATCCCACTTATAACTACCTCAACCAAGCTGTAAAGATATGGCTGAGAAGTTAACTCAAGCCAAGACAGCTATCCCAAAA
 CGACAGCCAAAGTAGAAAGTGAGAGGCTCCACACTTTCGGAGTGAGGGATGTGGGGCCAGTGAACACCTTGGTTGAGTAGTCTTC
 GGAGGCCCTCGAATGAACCTGCTTCTAGCTTAGAGAGATGTCCGGAGATTCAAGACAGAGCTTATCTCCACACTTAGCAAGCAAG
 CAAGAGATGACAGTCTCTCTAAATGCTCCACAGAGCACCCTGCCCTCCCTTCTGCTCTCCACCGCTTCTCTGAGGTCCAGG
 CCACACCATGACGCTGAGGCAGTCCAGCTGGGGCTCTGGATGGCAATGACAAGTAGTGGGTCTCTATGATGGGAATAAAAGGT
 20 AGGGGAAAGGTGACAGGAAGGAGAGAAGTGACCCTGCTGACAGAGGCCAGCAAGCTACTTCTTTGTTCTCTGTCAAGGCTC
 CACTGATACCTTCTCATGTTCTGCTTTTGATTCTATATCTTTTATGAAGAAACAAATAAAAAAAATTTTCCCTCGAGGAAA
 CAACCTTG

 MOUSE SEQUENCE - CODING
 25 ATGGACCCAGGAAACCCAGGAAAAACGTGCTGGTGGTGGCTCTCCTTGTCTATTTCCAGGTGTGCTTCTGCCAAGATGAGGTAC
 CGATGACTACATCGGCGAGAATACCACGGTGGACTACACCTGTACGAGTCGGTGTGCTTCAAGAAGGATGTGCGGAACCTTAAAG
 CCTGGTTCTCGCTCTCATGTATTCTGTCTATCTGCTTCGTGGGCTGCTCGGCAACGGGCTGGTGATACTGACGTACATCTATTTC
 AAGAGGCTCAAGACCATGACGGATACCTACCTGCTCAACCTGGCCGTGGCAGACATCTTTCTCTTAATTCTTCCCTTCGTGGG
 CTACAGCGAAGCCAAAGTCTCGGATCTTTGGCGTCTACCTGTGTAAGGGCATCTTTGGCATCTATAAGTTAAGCTTCTTCAGCGGA
 30 TGCTGCTGCTCTATGTCATCAGCATTGACCGCTACGTAGCCATCTGTCAGGCGGTGTCGCGTCTACGCCACCGCGCCGCTGCTT
 CTCTCATCAGCAAGCTGCTCTGTGTGGGCATCTGGATGCTGGCCCTCTTCTCTCCATCCCGAGCTGCTCTACAGCGGCTCCAGAA
 GACAGCGGCGGAGGACACGCTGAGATGCTCACTGGTCAGTGCCCAAGTGGAGGCGCTTGATCACCATCCAAGTGGCCAGATGGT
 TTGGGTTCTCTAGTGCTATGCTGGCTATGAGTTTCTGCTACCTCATTATCATCCGTACCTTGTCTCCAGGCACGCAACTTTGAGCGG
 AACAGGCCATCAAGGTGATCATTGCCGTGGTGGTAGTCTTCATAGTCTTCCAGCTGCCCTACAATGGGGTGGTCTGGCTCAGAC
 35 GGTGGCCAACTTCAACATCACCATAGCAGCTGCGAAACAGCAAGCAGCTCAACATTGCCATGACGTACCTACAGCTGGGCT
 CCGTCCGCTGCTGCGTCAACCTTTCTTGTATGCTTCATCGGCGTCAAGTTCGCGAGCGACCTCTCAAGCTCTTCAAGGACTTG
 GGCTGCCCTCAGCCAGGAACGGCTCCGGCACTGGTCTTCTGCGGCGATGTACGGAACGCGTCCGTGAGCATGGAGGCGGAGACCAC
 CACAACCTTCTCCCGTAG

 HUMAN SEQUENCE - GENOMIC
 40 AATATATGAAACAAATATTGACAGAATTGTCAAAGAAATAAGAGAAACACATAAAGCAAGAAATAAGAGAAACACATAATTCAACA
 ATAATAGAACTTAAATATCTCTCTTCAATAATAGATACAACAACTAAGCAGTTGATCAACAAGAAAACAGAAGATTGAACAA
 GCTATGAACCACTAGACCTAACGTCTATCTATAAAACACCCACCAACACAGCAGAAATACATATTCTTCTCAGATATACATAGAA
 45 CATTCTCCAGGATAGGCCATCTGTTAGGACATAAAACAGTCTCAAAAATGTAAAGAAATTGAGATCAGACAAAGTCTGTTCTCT
 GACCACAAACAGTAACAGAGGAAATTTGAAGAAATCCATAAGTATGTGAAATGAATCAAGGAACTCAAGGAAATTAGAAATAC
 TTTGAAATGAATGAAATGAAACACAGCATACCAAACTTATGAGATGACGCTAAAATAGTCTTACAGAGAAATTAATAGCTAT
 TAATGCCGTATTTTTTAAAGAAGAAAGATACCAAAATTAAGAAAAAACTTTTCACTTTAAGAAAAAGATAGTGAACCAAGCCCA
 AATCAAGCAGAGGAAGGAAATTAATAAGATTAGAATGGAAGAAAAATGAAATATGGAATTTGGAAGAACTAGAGAAAAATTAACAAA
 50 CCCCAGGTTGTTTATATCAAAAGATTGATAAGTTTGATAAACATTTAACTAGACTTACCCTAATATCAAAACCATACAGATAT
 CACAAGAAAAGTACAGACCAATATCTCTATAAGACATATAAGATAGATGCACAATTTCTTAACAAAATATTAACATGCCAAAT
 CCAGAAACATTACAAAAAAATTTGATACCATGACCAAGTGATTATTTCCAGGAATTCAGGTTGGTTTAAATATAAAAAATCAAT
 TCATATAATACCATATTTAATAGAATAAAGGCCAAAAACATCAATTGTCTCAGTGGACACAGGAAGGCTCCCACTCCCTCC
 ATGTCCTCCAAAGGACATTATCTCATTCTCTTTTATGGCTGCATAATTTCCATGATGTATATGTAGCACATTTCTTTAACC
 55 TCTATCATTGATGGGCATTAGGTTGATACCATGTCTTTACTATTGTGAATGGTGTGCAATAAACATACACGTGCATGTGCTTT
 ATAATAGAACAAATTTATTTCTTTGGGTATATACCAGGAATGGGATTGCTGGGTCAAATGGTATTTCTGCTCTAGGCTTTGA
 GGAATTTCTATACTATCTTCCACAATGGTTGAACATAATTTACACTCCCAACAGTGAAAAGCATTCTTTTCTCCACATCACC
 AGCATCTGTTATTTTGAATTTTGTATAATAGCCATTCTGACTGGTATAAGAGGGTCTCTCACTATGGTTTGTATTGCTATTTCT
 CTAATGATCAGTGTGTAGCTTTTCAAAATATGATTCTGGGTACATGTATGTCTTTTGTGAAGTGTCTTTTCATGTCCTTG
 60 GCCCAATTTTAAATTTTTTTCTTGTAAATTTGTTTAAAGTTTTATAGATGCTGGATGTAGACTTTTCGTGAGATGCATGGTTG
 CAAAATTTTTTCCACTGCGTAGGTTGTCTGTTCACTCTGTTGATAGTTCTTTTGTGCTACAGAAGCTCTTAGTTTAAAGTAG
 ATCCCTTAATTTACTTATTTGTCAATTTTGTGTTTGTGTTTACAAGTCTTTTGGCATCTTTGTGATGAAATCTTGGCCCGTGCCTTG
 GTCCTGAATGGTATTGCTAGGTTTCTTCTAGGTTTATAGTTTATAGTTTACATTAAAGTCTTAAATCCATCTTGAGTTGA
 TTTTGTATATGCTGTAAGGAAGGGTCCAGTCCAAATTTCTACATATGGCTAGCCAGTTATCCAGCACCATTATTAATAAG
 65 GAATCCTTTCGCTATTGCTGTTTGTGTCAGTTTGTGAGATGACGTAGTTGTAAGAGTGCAGTCTTATTTCTGGGTCTCTAT
 TCTGTTCCATAAGTCTGTGTTTGTATGATCAGTGTGTTTGGTGTAGTCTGTTTGGTACTGTAGCCATCAGTATAGGTTGAGGAG
 CATGAGGCTCCAGCTTTGTTCTTTTGTCTAGGTTGGCTGCTATTGGGCTCTTTTGGTTCATGTGAATTTTAAATAG
 TTTTCTAGTTCTGTGAAGAAATGTCAATGGTAGTTTAAATGGGAATAGCAATGAATCTATAAATGCTTTGGGCAGTATTGTCTAT
 70 TCCACAATACTGATTCTTCTATCCATGAACACGGAATGTTTCCATTGTTTCCATTATTTCTAATTTCTTTGAGCAGTGGTT
 GTAGTTCTCTTGATAGTGTCTTCACTTCTCTGTTAGTGTATTTCTAGGTATTTTATTTCTTTTGTGGCAATTTGTAATTTGA
 GTTCATGCGTCTTTGGCTCTGCTTGCCTGTTTGGTGTATAGGAATGTAGCAATTTTGCACACTGATTGTTATCTCTGAG
 AATTGCTGAACCTGCTTATCAGCTGAAGAACTTTTCGGCTGAGACAGTGGGTTTCTAGATATAGGATCATGTCATCTGCAAA
 CAGGAATAGTTTCACTTCTCTCTCTTCTTATTTGAGTACATTTTCTTCTTCTTCCCTGAAATATGACTGCCCTGCCAGAACT
 75 CCAATACTGTGTTGAATAGGAGTGTAGAGAGAGCAACCTTGTCTTGTCTGATTCTTCAAGGGGCTTACTTCCAGCTTTTGCCCA
 TTCAGTATAATATGTCTGTGAGTCTGTCTATATATGCTCTTATTTTGTAGGTATATCTTCAACACCTACTTTATTAAGAGT
 TTTTAAACATGAAGGGTATTGAATTTTATCAAGGCCCTTTTCTGCATCTATGGAGATAATCATGTGGTTTGTCTTTAGTTCTGT

239

240

TCTCCATCGCTGTGGACAGTAAGGAACCTCATCCCTCTACCCAGCCTGTGAGGTATCCTCCTCAGCCCCACCTCCCTCAGG
AGACACTCAGGCTTGGCTTCATGCACGTGTGGCTGCGCACTCACCTGGATGCCAGGAAAATGCTCCTGGGCCAGTGGCTACAGCA
CCAAAGCAGGGCTGGAAACGTGTGCACCTACCCACGACCTCATAGCTTTGCCGCTCATCCACATCAGGTGGAGTGGAGGGGG
CACTCAGACCCACCAACCAAGCTCAGTCTTGAGGGGTGGTCTGGCTAGAGAAGACTCCAGCTCCAAGAAGCAGCCAGATGGG
5 CCAAGACAGGGGTGGAGGGGTGCCCCGCTTCTGATGCTGCTTCTTCCAGGACCTGGAGTGGAGGAGGACAGAGAGGGT
GAGGACAGTGATGCCGGCAGCAGGCCAGGTGTTCAAAGGCACAACTGCTGTTCTGATGTTCTCTTTCAGCAAAACAGTGCCTGGA
GCTTGGGAGGAAAGTTCCCAACAGCGTCTCCCCCTCACTGCTTTCTTAAACAAAGACTTGTCCCTGCCAAGCAATAACTTTC
10 TCCGCTTGTCTCCTACAGGGAAACCAATGAAAAGCGTGTGGTGGTGGCTCCTTGTGCTATTTCCAGGTGAGGTTCTCTGCCAAG
GAAAGCTCTGTTCCCTTCTCCACAGGCTCCCAAGTCAGGGGTTTAGTGGAGGAGCTGGGCATTGCTAGAAGATACAAGACCA
GACATAAGCCCGCTGCCACTCATTAAGCTAATGGCTGCCCTCACCCTCTGCTGAGTGACCTGGAGAGCCACAGATGTTCTCT
GGACTCTCTTTACTCCATTTAGGTTAAACATGGGGGAAAATAACTTACCACCTTCCCTATCCCACTTCCAATCTCCCTGCCAAG
AGACAGAAATATGGACTCTGAGTCTTAGAGAGAGAAGAGCTGCAAAAAGCAAAAATGTTACTGGGTTTGTGACGTGTGCTGA
GAAAATCACCCTGGATCTGGCGATCTTGTACTATCTATCGCCCCAAAGTTGTCTCTTCCAACCTTCAACCAAGGGCTCCCTC
15 GCAGCCCCCGTTTTCTTGGTGAATAGAGACCCATCCGGCTCTCCCTGGCAGGGGAGGGAAGAGAGGATGGGGCTTAGGATGGG
GAGAGGGGTGGATGAGCACACTTTATAGCAGGCTGAACTCGGCAGGAACAAAGACCTCACTTTACAAAGTCTGTTTCTCCA
TCCAGAAACAGACAGAAAGTGTGCTCACCAGTGCCAAAGTTAGAAGAACTGTAACCTCGCAGAGTCAACTTTCTCCATTGTTT
AGAGGTGGGAGCTCAGAGTAGGGTAGGGAGTCCAAGTGAAGCCAGAGCTAGAGAGGCAGTGTCTCAGAAATTCGGCTCATCCCA
GGTCTGGAGGCCAGAGGGGAGCTTTCCAGAAAGCTCAGGCCAGAGGAGGCCCCAAGCTGGGCATGTTCCCAAAACCCCATCCCA
20 GAGGCCCCCCGGAGCTGGGCTGCAGCCCATAGCTGCCCCCTTCCCATCACCCTCCCTCTCTCTCCCTGTCTCCAGGA
CTCTGGGGGCTGTATTGCTGGCAGTGGAGGCTGGAAGGTGGGAAGGGAGGAGGACAGCTGAGGCTCATTCTCCCTTTCACTT
GGGAGGGGGTGTCTCAGATAGGGCAGGATGTGGTGGGGCTGTGGGCTGAGAGGCAGTGAGGCTAGGGGAGGAGAAATATAAAG
AGGAACAGGTTCAAGGGGAGAAGGAAGGCAGGACTGGATGATGAGAGTGCCTTATAGAGGCCGGGAGTACTGCCCTCCAGG
AAGGCTGAGACCCCTCATGTCCAGGACCCCGGTCTAAGGCTTGGGCGTAACCATGGCTGGGCCAAAGGCAGCAGCTCCTT
CAGGGCTCCAGGCTGCAGCCATGCCAGGAAGGGAAGGGGTTGCCACTGACTTTTCGTCTCAGGCTGCAATGGCCAGGAA
25 AAGGCTCCTGGACATCATTTGTCTCACCAGTGTCCCAAGCAGGACAGTGATGAATCCAGAACTGGGTGTGAAAAGAGATAGA
GACAAGATCGGTTGAATCCCTCCAGCATAAATGGATAGAAACCCAGCTGCTGAGCTGTGAATCTGGTTCTGTGTATAGAA
ATGAGCTCTGTGAGGCAGGTCTCCAGCCAGCTCCTCGCTGCACAAACCCGTCATCGCTGTGCGCAGAGGCAGGACCA
TGGACCCCTCCTTATTGATAAAATCACAGCAGGCTGCTGAACCTTCAACCGACCTGCAGACGGCTAAAAAAGCTCCAGCAGC
TGAGTCTGTGATTGGGATCTGCCGGAAGAGATGCGAGGAAGAGAGAGGAGAGAGGTGGGGGAGAGGGGAGCAGAGAGGG
30 AGAGTGGGAGATGAGAGCTGCGCTTCTTCCAGGGACACAGCTGCTGAGGAGTCTCGCCCCACCCCATCGCCCATCATCTC
CACGGAGTTTATGGCACTTGGGCTCAGTGTGCTGAGCTCCTGCTGGGTGCTAAGAGGGGACCCAGGATCTAGAGTCTCTCCAGGT
CACCACCACCCATGATCACAGCAGTTTCCCCCAAACCCAGGCTTCTATGGCCTCAAATGGGAGCATTTGCTTCTCTCTTCTT
ACTCCAGGCTCCTCAACCTTGACCCCGAGGTGGATTTCCTCCCTAAAGCTGAGGTCTTTTGAAGCCCTTGGAAACCTCCACC
AAGTTCTAAAGGAGGGTCAAGAGAAAGACATGTTCCCTCTCTCACGGAGCTTCCAGGGGCAAAATTAAGCTCCATGGAGAG
35 GAAATGTGTCTGGAGCTGGGCTAGGTACTCTCACGCAACCATGGGAAGCAAAATAGGATTCTATCTCCATTTACAGAAAGAGAAAC
TGAGGCTCTGAGAGAGAGAGAGAGACAGAAAGAGTTTAACAGCTCAAGGCTCATCTGGCCCCAGAGCCAGCTGATTTCAGT
CCCTGTCTCAGCAGATGTAGAGTCTCTCAGACTGGCAAAATCAGCCACTTGTACTACTAGCAGAACTGTGAATCTCAGGCCCC
ACCTTAGCCTACTGATTAGGATAGACATGTTTACAGGATTAATCAGGTGATGCGTATTGGAGTTAAATTTGAGAAAGCACTGATT
TAAACCAAAGAAATCACCTGGAGACTTTAGGAAAACAGAGTTCTAGACCCATCACTTGAGATTCTGGTTGAGAATCTCAGGTG
40 GGGCTTGAGAAATTTGCATTCTCAACAAGTTCCAGGTGATGTATGATACTGATGATGCGGACCTCAGATGAAACCACTTCTCT
CCCCCTGGGCAACATGGCAGAAATCCCATCTCTACTAAAAATACAAAAATCGCTGGGTGTGGTGGCATAGGCTGTGGTCCAGC
TACTCAGGAGGCTGAAGTGGAAAGGATCACCTGAGCCTGGAGAGGCGAGGCTGCAGGGAGCCATGATTGCACCACTGCATCCAGC
CTGGGCAACAGATGAGACCATGTCTCAAGAAAAAAGAAAGAAACCACTGCTCTAGGCTAAATCCAGCCAGCTTGGAG
CCACCCAGCTAAACTGGCTGTTTTCTCTCATTTCTTCCCGAAGGTATGCTGTGCAAGATGAGGTACGGACGATTACATCG
45 GAGACACACCACTGAGTACACTTTGTTGAGTCTTTGTGCTCCAAGAGGAGCTGCGGAACTTTAAAGCTGTGTTCTCTCTCT
ATCATGCTACTCATTTGTTTCTGGGCTTACTGGGCAATGGGCTGGTCTGTGTTGACCTATATCTATTTCAGAGGCTCAAGAC
CATGACCGATACCTACCTGCTCAACCTGGCGGTGGCAGACATCTCTCTCTGACCTTCTCTTCTGGGCTACAGCGCGGCCA
AGTCTCGGCTCTCGGTGTCACTTTTGCAAGCTCTTGTGCTTTCAGTCTACAGATGAGCTTCTCTAGTGGCATGCTCTACTTCTT
50 TGCTCAGCATTGACCGCTACGTGGCCATCGTCCAGGCTGCTCAGCTCACCGCCACCGTGCCCGGCTCTCTCATCAGCAAGT
GTCTGTGTGGGCTCTGGATCTAGCCACAGTGTCTCCATCCAGAGCTCCTGTACAGTGACCTCCAGAGGAGCAGCAGTGAAGC
AAGCGATGCGATGCTCTCTCATCACAGAGCATGTGGAGGCTTTATCACCATCCAGGTGGCCAGATGTTGATCGGCTTTCTGTGCT
CCCCCTGTGGCCATGAGCTTCTGTACCTTGTATCATCCGACCTGCTCCAGGCACGCAACTTTGAGCGCAACAAGGCCATCAA
GGTATCATCGCTTGGTCTGTGCTCTCATAGTCTTCCAGTGCCTTACAATGGGGTGGTCTGGCCAGAGCGGTGGCCAACTTCA
55 ACATCACCAGTAGCACTGTGAGCTCAGTAAGCAACTCAACATCGCCTACGACGTCACTACAGCTGGCCTGCGTCCGCTGTGTC
GTCAACCTTTCTGTAGCCTTCTATCGGCTCAAGTTCGCAACGATCTCTTCAAGCTCTTCAAGGACCTGGGCTGCCTCAGCCA
CCAGCTACCTCAACCAATGCCAAAAAAGACAGGGCTGATAAGCTAACACCAGACAGACAACTGGGAAACAGAGGCTATTGTCC
CCTAAACCAAAACTGAAAGTAAAGTCCAGAACTGTTCCCACTGCTGGAGTGAAGGGGCAAGGAGGTGAGTGAAGGGGCG
60 TGGGAGTGGCTGAAGAGTCTCTGAATGAACCTTCTGGCTCCCAAGACTCAAAATGCTCAGACAGCTCTTCCGAAACCCAGGC
TTTATCTCCAAGACAGAGATAGTGGGAGACTTCTGGCTGGTGGGAAAGCGGACATCAGTGGTCAAAACAACTCTCTGAA
CCCCCTCCCTCATCGTTTTCTTCACTGTCTTCAAGCCAGCGGGAATGGCAGCTGCCACGCCCTTAAAGCAGACTCATCCCCCT
CACTTGGCGCTCGCCCTCCAGGCTCTCAACAGGGGAGAGTGTGGTGTCTTCTGACGGCCAGGCGAGCTGCCTCCGCGTATCAA
65 AGGCACACTCTGGGCTCAGAGTGGGAGTACATGCTCAGCTCTTGGCTCCACTGGGATGGGAGGAGCAAGGAAATGTC
AGGGGCGGGAGGGTGACAGTGGCCGCCAAGGCCACGAGCTTGTCTTTGTTCTTTGTCTTGTCTCAGGGAGTGAAGACCTCTCTCAT
GTTCTGTTCTCGATTGTTAAGAGAGCAACTTTACCCACACAGATAAAGTTTCCCTTGGAGAAACCAAGCTTTAAAGGAA
AAAGAAAAAAAGTCTTTGGTAAATGGCAATGAGCGTGTCTTTGTTTGAATCCCCACACCCCACTGACGCTCCCTCTCC
70 CTTCTCCTCCCTCTCCAGGCTCGTTTCTTAGAGAGCTCAGAACCAAAAGTTGCTCAGGAATGCTCTGAGAGCTCTTGGT
GACACAGGACCAAGAGGTGAAGAGTGAAGAGATGAGGACAGGAGGTCCATCTTGCAAAATACCTTCCAGAGTTCAAGGGATA
GGCCCCAAGCCTGCACAGTCAAGCTGAACCGGACATGCTGATCTTCTGAGCTTTGGGAAGGCCAACTTTTCCGGGTAACTCG
ATACCTGGGACTCTGCAATTAGCAGCTCTTGACAGTACGCTGCTCAGCTGCTCCAGCTCAGACAGAACTTAAAGCTT
75 TTTGTACGCCCCCTAGACTCTGAAGCTGGGGTTTGGAGGGAGGCGCTTCTGTGGGCTTGGAGACCACAGCATATGAGTACGG
GTCTAGGATGAGACCTTTGCTGGCATGAGAGCTGGAACCAACCATGATCTCTCTGCTAGCCACTGTAGCAGAGTGGCTCCGT
GGTGTATGTATAGTCCCTTCTGCTGTGTACAACAAATGCCACCGATGGAGTAATTTACAAACCATAGAAATGTAATTTCTCAG

TTTTAGAGGATTGGAAGTCCAAGATCAAGACGCCAACAGATTCACTGTCTGGTGTGGACTCTCTCTGCTTCCGAGATGGGGCCTTG
CCATGCCCTCTGGAGGGGACAAACACTGTGTCTCATGTGGTGAAGAGTGAAGATCACAATGAGCCTAACTAGTTCCCTCTCTGC
TCCTTTATTGCTATAAGGGCATTAACTCCGTTTCAAGGGTGGAGCCTTCATGACCTAATCAACTCCCAAGGCCCCCCCAACTT
CTCATACCAATTGCTTGGGGTTATGTTCCAAACCATATGAATGTGGAAAGATACATACATTCAAACCATAGTGTGGATCTGACT
5 GTGGAGGAGCAGGAGAGGAGGACAGACAAAGGCCCCACACAGGCCAGGTGTCGCTGTCTATTTCGTGCTTGGTGCCACCCAGAG
CCGTGACTTCTGCAAGCCAGAGAGCAGGTCACTCAACCTACAAATGCGTCAAGAGGGGTCTGAAGGACCAGAGCTGCAATAGCTC
TGGGCGTGGGAGCTAGAGGGAGGGCTGAGGCACTCAGCAATAGGTGATTCCATCCATTTCCCAAGTGGAAAGAGCCTCGTTG
AAAATGGAGCTGCCTGGTAAATGACACCCATTGCTCATCTCGCAAGCACGTGACATTACCTCTCCGAGAGATGCACTGGGCTGG
AAGGTTTTAAACAAGATTGTGCTGCTCCAAGCCGGGAATTGGCGCCTGAGAGGAATGAGCCTGGCAGGATGCACTGAGCAGC
10 GTGGAGCGGCTTTCAGCAATGGCATTAAATATTTAAAGGCACAGCTGCGACTGTGTGCTGAGCGTGTGGCCAGGGGGCAATGC
CAGTGTGCGTGTGTGTCCCGAGGGGAACCTGCGGAGCGCATGTGTGCTGTGGAGCCGCTGGTGTGGACATCTTAATGAGGTAC
AGATGGGAAAACACCCCTCGGTTCTGAAGGGGAAGAATGTAACAGAGCAGTCATGCAAAAGGCAGCCAGGCCAGCCGACAAATG
CGCCCCCTCAGCTCAGATACATTTTCTAGAATAACTGGACATCTCCAATATTTACAGAGAAAACAAACCCCAAGCAATGTCA
ATTCCCTCGAACTGCTGTGTCTCAGAAGTTCTGACCTCGGTTCACTGCTGGCCTGATCCCTGCTCCCTTGGCCGAGGCTCTCATGT
15 GCCCCATCTGAGCTTGGGGTGACCCCTGGGAAGAAGGAAAGGCCCTGGGAGGCCACCCAGGGCTTCTCTCTTTCTTTTCTTAC
CTGCTTCATACATCTGAACCCCTCTTCCAGGTTTCAAGCCAAATAGCCTTCTCCAGTCACCTGAAATTTCTTTTCTTATTCATCCC
CAGGCCCTCATCTCCCTCATCTTGTGCTGCAACCCCAAGCCCAAGGTATTCCCAAGGCCACAGGTCTCCCTTCTCATGT
AGAAGCACCAACCTTTCTCATCAGAGCTCAGAGGCTCCAAGGGACCTCAAAGATCAGCTGGGCCAATCCCCAGTCATTTTCT
AGATGGTGAAGTCTGAGGCCAGCGGGGAGAAGCTGACTTGCCTGAAGAGGCGTGGCAATGCAAGGATATTGGTTAACTTGTCTTGTG
20 GAAGCCTGAGCGTCTGGCAGGGTTGACAGGAGGTGTGGGGAGAGCAGAGACTCTGGAGCTCTGCGACTTTGAATCTCATCTCTA
CTGCTTCCAGCTATGTGACCTTCACTGCTGTGGCCAACTCTGAGTCTTGGGTTTCTCAACTGCAAAATGGAGAGGATTTGGT
AAACAGTTAGCAGAGTGCCTGGAATGTTGAGTGTGGTGTGGAGGAAGGGGACTTTCAGCCAGACTGCTGCTGTTGAACCCCGGC
TCCACTGCTGGGCTGTTACTTAGCCTCCCTGTACCTCAGTTTCTTAATCTGTATAATGGGGATACTAATGGTACCTATGTCTCTA
GGATTGTTGTGGAAAGCAACGAATCCATATATGTAATACTTGAATAAACTTACATATGTGTTGTTGTAATCTTTAGGAGATGT
25 TTAAGAAACGGTAACTTAAAAAAGTTGCTAACCACAGGAACCAAATTCAATTCCTTAGCCCATTTCCATCCCCACAGAAT
TTATAATTTCAAGCTGGAAGGCAATTTAGAGATGAGTGAATCTGGCCTTTCATCCATTGATGGTGTGAGTCACTCTGTCTCTGAGA
GGGAAGCAACTAGCCTGAGGTCTCTTGGGAGGTCTTGTCAATGCTGGAACCTTAACTAGTTCCCTGGGCTCTGCAACAGCTCT
TCCCACAGACCCCTGCTGGGCTCACGGGAACATCCCTGCACATCCACGTTGGCACCCTCCCTCATCCAGCTGTCTGCTCTCTC
CGGAGGCAACCGTTCTCTTGTCTTGTATTAGTCTTAAAGGAGAACCTCCCTTCTCCCTTTAAATAGTTCCTGTCTTATCAC
30 TGAGTCTGGAGAATGAATGAATATAAAGAAATATGGCAGCGGTCCCAAGGAAATCAGGCAACTGATCTTTTAAAGAAAGGAG
ATGGGCCGTCTTCTCTGGGAATGGTTCTCAGTTACATGTCTTGTGTGGGGTGAACAGTGTGGAGGAAAGAAACAGACCTAAAGGG
ATTGTGGGGGAATTAAGGCAAGGAGATGGGGGAAGGCAAGGGGAGATGGGGCAGGAATGGGTTTAGGGAATATACACTGGG
GGCGGAGCTTGAAGCAATCTTCAGTGGTGTAGATGTCCCTCCTGATGCACACATGCAATGTGTCACACACACACACAC
35 ACACACACACACACACACACATAGAGCCTCCCAAGTCTCCCAATCTCAGGTGAGGAGAAGGGGCTCTATTAGTCTTAGAG
ACAGGTGGGCCCATGGCCTTCTTTCAGAGAAGATGGTTAGAATCGGTCTGTGCTCTGCTGAGACCTTAGAGAACTCCAAG
GAGATAAAAAAGGTTGGGGGGGGCCTCTCCCTCAACTCAAAGAGCAACCTTATCAGGCTTCAAGAAAGCAAGCCCTCTAGCA
CTCAACCAACCGGAGCAGCTGTCTGAGAAGTCCCAACTCTCCAGCAGCCACCCCTCTGTCTCTTCACTTCTTGTGGGCCAGG
40 CAGAGACACAGACAGGAGTCTGTGTGAGAAAGCTCCCAAGGCCCTTTCTGTGGAGAGTGTCTCCAGACTAAGCGAATCTCAG
CTGATCTCGTGGCAATCAGAAACGCCAGGATGTGATTCCCAAGGGCTCCTCTCTTGTGTCTGTGTGATACCCCAATTCAAGT
CCTCTGCCGCTGTGAGATTCTCTCTGCTCCATATTCATTTGAGGATGGATATAACCTTATTTTGTGTGTTCTTCAAGACCCCA
GGGACTTCTGCTAGTGGGCTGTCTTACGTGTACAGTAACCAACACATAGTGTGGCCTCCAGGTTCTCATCTCTGGGTAAATAAAC
45 ATCTCCGACAGGCTTGGCCAGCTCTGAGCTGGCTCAGTTCTGCTGATGCAATAGGTCTCCAGGTACATATCGTGCCCACTA
GCAAGAGGAAGGTAAAGAGATGGTTCTTGGCCCTGAAGTCTCTTGTCTGCTGTGTCAGAGTTTATTAGGACAGATTTATAT
TTGCTCCAAGTAAATATCTGACATTGGGAAGCACAGCAGATGACAGATGAGATGCCCCAAACCAATTTCCCAATGTTTAAA
AAGAGGCTTGAAGGACAGCTCATTGATCTCATTTGGTTTATGAACTGCACTCAAGTGAAGTGAAGCAGAACTGACCAAGCTG
50 TAAAGACTGAATGGCTCAATCTGCTTCCAGGCCAGAGGCTGTTTCTGTGGCCTGGCCAGGCTTGTGAGGAGTGTGCTAG
GGGCTCACCTATGTGGGAGCCAGCTCTGCTCTGCCCCGAAGCTCCAGAGACTTCTCTACAAGTACTCTCTGGACACGCCCCCTC
TTGCTTGCATGATCTCTTACCTGCCACTGCCCCCTCCCAACACCCCGATTTCAGGGAAGCTCAGCTGTGTGAGAGTGTGATT
GACAACCTCTGGACTTGGAAATCAGGAGGAAGGAATGGTGGCAGCTTGTGCTGGGCTGTTTCAAGGACATCCCC
55 TCTGCTTGTCTTCCAGGGCAAGACACAGGGCTAGACAGCCGGAATCTTAAATCTTTGTCAAAGCAGAACTGGGATTTTCG
TCCAGGACTACACCTGTCTGTCTCAGCTCTCTCAGTTGCCCCCTCCCAACCATGCTCATCAGAGCCGAACCTTGAGGAA
ACCATGGACCGAAAGACCTTGTGAGCTTTTGTGCTGGGAGTGTGAGGCTGGGAGACAGAAGGTATGAGAGATGAGATGCCATG
GAAGGAGTGGCAGCGATCAGAGGCTGGGGGAGAGGAAGAGACGTTGAAGAGGTGGAGGGGTAATGAACCTAGGCGGGAGAC
AGGCTAACATTTAAGTGCCTGATGCAACCAAGGACTAGGCTAGCTATACAACCTTTCATTGAATCTTATGACAAACAGAGAA
60 GGAACAGGTTTAGAGAGCTCATGTAACCTTACCTGTGGTGACACAGCTAGCAACTTTATTAAGATTTTGTACGTACTATACACTG
TATTAAGCATCAGTATCTTATCTCATTTAATCCCCAACAACCTTACTAGAGTCTCATTTAATAATAGGAACTTAGGCTCAG
AGAGGTTAAGTAACTTTATCAATGTACACAGCTACTAAGTGAATTTCAACAGTTCTAGCTGCTCCAAATTTCTGCTTTAGTCA
CCCTACTTCAAGCTTCACTTAAACAGCTGTTTAAATACCAATATTTCTGGAGCCCTACTGAGTGCCAGGCACTGTGCTGTGTCCA
65 GCAACATCTTTCAAACCTGCCAGACACAGAGCTCTGACCTGGGAGAAGGAGAAATCAAATAACAAGACACAGCCCCACCTGC
CAGGGGCTGTGACCCCAAGCTGGGCAATAACAGGTCTTGTGCTCTCACAGTACCTTGTCCCTGCTCTCCCTCTAGGCCCT
GCTTCTTACCTAGGCTTCTTCAATGGGCTAGCCCTGAGATGACTGAGAGGGCTGAGATGGCTTTGCCACAGACTAGTCACTGGGC
AATATGGGAGGTCACTCTCTTCTTGGGCTCCAGCTCCCAAGTGTACAAATGAGGTTGCTGGACCAATCATTTCTACCCATC
GCTTCCAGCTCTGACTGTGATGGGTGCTTGTCTGGGAGAGTCTGGGAGGCCAGTGTCTCAGCGGGTAGGGCTCTGGGCATGTT
70 GATGCTTGCAGAGGTGACGGGCAAGTGTGTGAGGGGCTGAGGAAGTGTCTCCACCCAGCTGTGGTTTCTGTGGGGGCCACCAT
GGCAGCAGGTGGAGGAAGTGTGTCACTTCCAAAGGCAAGGCTCCAGGGCACCATGGGAAATAGGCGGC
AAGGGCGCCAAATAAACAACACTTCTCTTGTAGGCTCGGTGGCAGGATAGGAGCTGTCTAAGGAGTGTCTCTTGGGG
TGGTGAAGAAAGGTTGAGATTTGTCGCCAAGAACCTCACACTCACAAGAGCTGTCCACCTCACAACAGGCCACACATACAG
ATGCTCAATATTCACAAGAAACACCAACCGCACACATCACACACACACACCAACACAGCAGTCAACAATCAGCATACACATA
75 TACACATACAAATAGAAACTTGCCTCATACAAGACAGCTCATGGGCCGCGACCTGCACAGTCACTTGGCCCTGCACTAAG
GCCCTGCACTAAGGCCATGCTGGGTATATGCTTGTGCTGCTGCACTTTGAAATTTCTTAATTTTAAACAAGGGGCGCAGCA
TTTACATTTTGAATGGGCCCTCAGGTTCTGCACTGCTCTGTGGGTGTGCACTCATGAGAGCGTTCACTACCTGCTTAAGCAT
ACCTTTTAACTTTTACACTGTTGATGGGAGTCAAAATAGTTCAACCAATGTGGAAGACAGTGTGGTGTCTCTCAAGGATCTA
CAGCCAGAAATACCATTTAAACCCAGCAATCTCATTACTGGGTATATACCAAGGATTACAAGTCACTTACTATAAAGACATATC
CACAGTATATTTATGCACTATTTTACAATAGTAAAGACTTGAACGAACCCAAATGCCCATCAATGATAGACTGGATAAAGA
AAATGTGGCAGATATACCATGGAATATATGACGCCACAAAGGAATGAGATCGTGTCTTTACAAGGACATGGATGAAGCTG

5 GAAACCATCATTCTCAGCAAAATAACACAGGAACAGAAAACCAACACCATGTTCTCACTCATAAGTGGGAGTTGAACAATGAG
 AACACATGGACACAGGGAGGGGAACATCACACTGGGGCTGTGACGGGTAGTAGGGGCAAGGGAAGGAGAGCATTAGGACA
 AATACCTAATGCACGAGGGACTTAAACTTAGATGATAGGTGTAGGTACAGCAAAACACCATGACACATGTATACCTATGTTAC
 AAACCTGCACATTCCGCACATGTATCTGGACCTTAAAGTAAATTAATAAAAAAAAAAATCCTACCTATATAGCAAGAGTGATC
 10 CGTACACACATACACAGATGCACAAACATGCATGCCACAAATGCAACACCCACACAAACAGCAATAGCCCCCATGTTTAC
 GCGCAAGACACACATGTATACCCAGAGGGGTCCAGACGCTCACAGCAACGCTACAACATGCAGCCTATGCCCTGCAGCCTG
 CTGACACAATTCAATTGACTTAACATTGGGGGACAGAAACAATGTGAAGGGAAGGGGCTTGGAGAGAAACAGGTTTATGTCTC
 CACCTGCAAAACATCTCCACCTCTCTCTTGGGCCCTGGGCTCACCCACCCACTCAGCGGCTGGGACCAGAAGAAAGGGAGGCCA
 15 GGGAGGTGGGCGCATGGACGGAAGGGGACAGGGATGGAGGTGGAGAGGGAGAGAGAGGGCAAGAAAGAACGGGTGGGGAGTGG
 GGGCAGGAATGAGTCCCCAGGTGAGCTGGCCCCAGCAGTGGTCTCATAAGAGCTCAGAAGGTCTTGGACCCAAAGCAGTAAGAAC
 AATGCCCTGTGCTCCCGCAAGCACAGGGCGGTCCCGCCCTCAGAGTCAGTCAGAGGATGCCACCTCCCTTCTACTAGCTACA
 CAGCCTTGGGACAGCCGTGTAATCCGGGCTCAGCTTCTCTTGTGGAATGGGATAGCCAATTCTACATTGCAGGGTGGCAAG
 GCACACACAGACACAACCTCTGGATTCTGACAGCAATCAACAGCTCGTCTCGTGATCAGGCCTGCAATCTGATTCTTGGCACA
 20 GGAATCCAGACCCCTCATTACAGCAGACATTTGGAACGCGTTTATTTCCCATCTTCTCTGCTCTCACTTCAACCTCACAGCC
 AGGTACAAGCACAGAGGTGGATGTAATTCATGGCTCATGGCCACCATCACTTCAGGGACCTTCAGGATCTGACAGCCCCATCTG
 CCCCACCCCTTACCCAAACCAAGCAGGACTCCAGGGCTGGAAATTTTCTTCTCTCTTATTCTTTTTTTTTTTTTTTTTTTT
 TTTTGAGACGGAGTTTCACTCTTGTGGCCAGGCTGGGCAATGGCGCATCTCGGCTCACCACAACCTACCTTCTCTGATT
 25 CCATTATCTGGCTCAGCCTCTGAGTAGCTGGGACTACAGGCACCCACCCATGCCCGCTAATTTTTTGTATTTAAGTAGAG
 ACAGGGTTTACCGCGTTAGCCAGGATGGTCTCGATCTCTGACCTCATGATCTGCCCGCTCGGCTTCCCAAGGTGCTGGGATTA
 CAGGTGTGAGCCACCGCGCTGGCCTCTCTCTTATTCTTACCCCAACCTGTATTCTCCACCCCAACCTAACCTTCTCTGATT
 TATTT
 30 GCAACCTCTGCTCCAGGTTCAAGTGACTCTCTGCTCAGCCTCCCGAGTAGCTGGGATTACAGGCATGCGCCATCAGCCCCAG
 CTAATCTTTGCTTTTTTTTTTTTCTTTTTTTGACAGAGTCTCGCTCAGTCGCGCCAGGCTGGAGTGCAGTGCAGTCTCGGCTC
 ACTGCAAGCTCCGCGCACCGGGTTACGCCATTCTCTGCTCAGGCGCCGAGTAGCTGGGACTACAGGCGCCGCCAATATGCC
 25 CAGCTAATTTTTGTATTTTAGTAGAGACGGGTTTCACTGTGTAGCCAGGCTGGTCTGCAACTCTGACCTCTAGTGATCCGC
 TCACCTCGGCTTCCCAAGTGCTGGGATTACAGGCATCCCTATTTAAATTTGTCAGGCTCTGCTCCCTTCCCTGAAACCCCATC
 ATTCTGTTAGGTGATACAGATTCTTAAAGAGTGATTTCGGGAAACAGAAATGGGCCCTAAGGGGATGCGAGTGTGCCCATTTCCA
 ATTACAGTCACCCACAGGAGAGAGGAAAGGTCTGCAAGTGCCACCAACAGAACTATTTTATCAGATTTCTTTTTTGTGTGTC
 30 TGTTTGAGACGGAGTCTCAGCCGCTCAGGCTGGAGTGCAGTGGCGCATCTCGGCTCACTGCAACCTCTGCTCCCGGATTC
 AAGTGATTCTCTTGGCTCAGCCTCCCAAGTAGCTGGGACTACAGGCACGCCACCACTACAGCTAATTTTGTATTTTGTATG
 ATACAGGGTTTACCATGTTGCCAGGCTGCTGCAACTCTGACCTCATGATCCGCCACCTCAGCTCCCAAGGTGCTGAGAT
 TACAGGCTGAGCCACTGCGCCCGGCTATTTCTTCAAGTTCTTATAGGACATAAGTCACTCAGATCCCTCAGAGGCTTCTGT
 35 CAACTCTGAGAGGAACTGAGTCAAGGAAGAGTGAAGTGACTTGGGTGAGCAGCAGAGTTGAGGGTTGTGGTCTTCTGTATGT
 GCAGTCTCCATGAGACCAGATC

40 HUMAN SEQUENCE - mRNA
 GTGAGACAGGGTAGTGGAGGCGGGCACAGCCTTCTGTGTGGTTTTACCGCCAGAGAGCGTCATGGACCTGGGAAACCAAT
 GAAAGCGTGCTGGTGGTGGCTCTCTTGTGATTTCCAGGTATGCCTGTGTCAAGATGAGGTACGGACGATTACATCGGAGACA
 ACACCAAGTGGACTACATTTGTTGAGTCTTGTGCTCCAAGAGGACGTGCGGAACCTTAAAGCCTGGTTCTCCCTATCATG
 45 TACTCCATCATTTGTTTCTGGGCTACTGGGCAATGGGCTGGTGTGACCTATATCTATTTCAAGAGGCTCAAGACCATGAC
 CGATACCTACCTGCTCAACCTGGCGGTGGCAGACATCTCTTCTCTGACCTTCCCTTCTGGGCTTACAGCGCGGCCAAGTCTCT
 GGGTCTTGGGTGCCATTTTGCAAGCTCATCTTGGCATCTACAAGATGAGCTTCTTCACTGGCATGCTCCTACTCTTGTGATC
 AGCATTTGACCGCTACGTGGGCTCATGTCAGGCTGTCTCAGCTCACCAGCCAGCTGCGCGCTCTCTCTCATCAGCAAGTGTCTG
 50 TGTGGGCTCTGATACAGCAGTGTCTTCCATCCAGAGTCTGTACAGTGACCTCCAGAGGAGCAGCAGTGAGCAAGCGA
 TGCGATGCTCTCTCATCAGAGCATGTGGAGGCTTTATCACCATCCAGGTGGCCAGATGGTGATCGGCTTCTGTTCCCCCTG
 CTGGCCATGAGCTTCTGTTTACCTTGTATCATCATCCGACCTGCTCCAGGCACGCAACTTTGAGCGCAACAGGAGTGTAT
 55 CATCGCTGTGGTGTGCTTCTCATAGTCTTCCAGCTGCCCTACAATGGGTGGTCTTGGCCAGAGCTGGCCAACTTCAACATCA
 CAGTAGCACTGTGAGCTCAGTAAGCAACTCAACATCGCTACGAGCTCAGCTACAGCTGGCTCGGTCCGCTGCTGCTCAAC
 CCTTCTTGTGCTTCTCATCGGCTCAAGTTCCGCAACGATCTTCAAGCTCTTCAAGGACCTGGGCTGCTCAGCCAGGAGCA
 GCTCCGGCAGTGGTCTTCTGTGCGCACATCCGGGCTCTCCATGAGTGTGGAGGCGGAGACCACCACCTTCTCCCCATAGG
 60 CGACTCTTCTGCTGAGTACAGGAGGACCTCTCCAGGGTCTCTGGGGTGGGATAGGAGCAGATGCAATGACTCAGGACATCCCC
 CCGCAAAAGCTGTCTCAGGAAAGCAGCTCTCCCTCAGAGTGAAGGGGCCAAGGAGGAGTGAAGGGGCGTGGGAGTGA
 CTCTCAACCAATGCCGAAAGACAGGGCTGATAAGCTAACACCAGACAGACAACACTGGGAAACAGAGGCTATTGTCCTTAAACC
 65 AAAAAGTGAAGTGAAGTCCAGAACTGTTCCACCTGCTGGAGTGAAGGGGCCAAGGAGGAGTGAAGGGGCGTGGGAGTGA
 GCCTGAAGAGTCTCTGAATGAACCTTCTGGGCTCCACAGACTCAAATGCTCAGACAGCTCTTCCGAAACACAGGCTTATCTC
 CAAGACAGAGATAGTGGGAGACTTCTGGCTTGGTGAGGAAAGCGGACATCAGCTGGTCAAAACAACTCTCTGAACCTTCCC
 70 TCCATCGTTTTCTTCACTGTCTTCAAGCCAGCGGAATGGCAGCTGCCACGCGCCCTAAAGCAGCACTCATCCCTCACTTGGC
 GCGTCCGCTTCCAGGCTCTCAACAGGGGAGAGTGTGGTGTCTTCTGACGGCCAGGCTGCTTCCGCGTATCAAGGCCACAC
 TCTGGGCTCCAGAGTGGGATGACATGCACTCAGCTCTTGGCTCCACTGGATGGGAGGAGGACAAGGGAATGTCAAGGGCGG
 75 GGAGGGTGACAGTGGCGCCCAAGGCCAGAGCTTGTCTTGTCTTGTGTACAGGAGTGAAGACCTCTCTCATGTTCTGCTT
 TCGATTCTGTTAAGAGACAACTTTATCCACACACAGATAAAGTTTTCCCTTGGAGAAACACAGCTTTAAAG

HUMAN SEQUENCE - CODING
 65 ATGGACCTGGGAAACCAATGAAAGCGTGTGGTGGTCTCTTGTGATTTCCAGGTATGCCTGTGTCAAGATGAGGTAC
 GGACGATTACATCGGAGACAACACACAGTGGACTACATTTGTTGAGTCTTGTGCTCCAAGAGGACGTGCGGAACCTTAAAG
 CCTGGTTCTCCCTATCATGTAATCATTTGTTTCTGGGCTACTGGGCAATGGGCTGGTGTGACCTATATCTATTTT
 70 AAGAGGCTCAAGACCATGACCGATACCTACCTGCTCAAGCTGGCGGTGGCAGACATCTTCTCTCTGACCTTCCCTTCTGGG
 CTACAGCGCGCAAGTCTGGGCTCTGCTGTCCACTTTTGAAGTCTCATCTTGGCATCTACAAGATGAGCTTCTCAGTGGCA
 TGCTCTACTTCTTGTGATCAGCAATGACCGCTACGTGGGCTCTGTCAGGCTGTCTCAGCTCAGCGCCAGGCTGCGCGCTCTT
 75 CTCATCAGCAAGTGTCTGTGGGCTCTGGATACAGCAGTGTCTCTCATCCAGAGCTCTGTACAGTACCTTCCAGAG
 GAGCAGCTGAGCAAGCGATGCGATGCTCTCTCATCAGAGCATGTGGAGGCTTTATCACCATCCAGGTGGCCAGATGAGTGA
 TCGGCTTCTGGTCCCTCTGCTGGCCATGAGCTTCTGTACCTTGTGATCATCCGACCTCTGAGGAGGAGTGAAGGAGTGAAGG
 AACAGGCCATCAAGGTGATCATGCTGTGGTGTGCTTCTCATAGTCTTCCAGCTGCGCTACAATGGGGTGGTCTGGCCAGAC
 GGTGGGCAACTTCAACATCAGCAGTACCTGTGAGTCAAGCAACTCAACATGCGCTACGAGCTCAGCTACAGCTTGGCTT
 CGCTCCGCTGCTGCGTCAACCTTCTTGTAGCCTTCTATCGGCTCAAGTCCGCAACGATCTTCTCAAGCTTCTCAAGGACCTG

GGCTGCCTCAGCCAGGAGCAGCTCCGGCAGTGGTCTTCCTGTCCGGCACATCCGGCGCTCCTCCATGAGTGTGGAGGCCGAGACCAC
CACCACCTTCTCCCATAG

MOUSE NOMENCLATURE
ICSGNM Ccnd1
Celera mCG21251

HUMAN NOMENCLATURE	
HGNC	CCND1
Celera	hCG27985

CACGGGATCCAAAACCTCTCCTGACTTCTGCAAGCGCTGCACACATGGTACATAGACATGCACAGCAGCTGCGTAAACATGC
TGGCTTTCTGTATCTACGGCTCTCTAATTTAGCATAACACATAGACTTTTTATCCTGTGTGCTGCCATGACTGACCCAGACCT
GCCTTTCAGGCTCTCTGCTTTTCAGACATGGGACAGTTCTGGGGTCTCTTTTGCAAAATGAGACCTGTGCTCACTAGCACAC
ATGTGGCCTTGGGTTCCATCCCGAAGCTGAGTGAATGAGGCATGGTGGCTACAGGCTGTGATTCCAATATTGAGAAATGTGGAGACA
GTAGAATGAAGATGTCAGTTTCAGGTACACCAAACTTGTACAGAAAGAGAGGGGGAAGGAAGGAAGGAGGGAAGAAATCT
AGCAAAAGATGGAGGAGCATACAGTGACTTTGAAGATGTGTTAACTTTCCCTTGCTGTAAAGAAATACCTCGGGTAACTTA
TAAAGAACAGAGGTTATGTGAACTCACAGTTTGGGGATTTTAGTCCAGAACAGGACTCTATTCTACTTCGAGTCTCTAATGCAGAT
GATGAGCGCAAAATGCTGAGCAAAACAGAACTGCACTGCCTGTCTACTACATGGCAAATCAGAGGAAGATGAGTCCCATCGTCTCTC
TGAGGCCACCTTCAGTAACCTAAGGACTGAAGCTGAGGCTGTGTTGTTGTTGTTCTGTGCTTAGGGTGTGTTGTTTCGGGTGTTGTT
TGGTTTTGTGGTGTGAGTTTGTGTCATTGCTGTTGTTGTTTTGATATAGAATCATGCTATGCAGCCCCAGGCTGTTCTCAAAC
TGTAAATCTCTGCTCTTCGCCCTCTGACTACATAGGATCACAGATGCGGCCACACACCTGGCTCAGAAATCCATCTCTTGGAAT
TCTACCACCTCCCAATAAAGCCACCTCGAGAATGAAGCTTGGACAACAGAGAATATGTGTAGCACAACCTACGACAGAAGGC
GACCAAGAGGCTTCGCAAAATCCAGAGCACTGGCCCATGTGCAATAGATGCCATCTGTAAGGAGTCACTTCTCCCAGGGTGA
CAGATTCAATGCAACCTCAATCAAACCTAGCTGTGGTGGGTTGTGTGTGTGTGTGTGTCTGTGTGTGTTATGTGTGTGTCTC
TCTATGCTATCTGTGTGTGTGTGGGGGTGCTAACCTGTGTCTGTGTCATGCACAGTGTGTGAGAAGAGGGTCCAGATGC
CGGCCATGCTAGGCCATGTACTGTTCCGATGGGACGGCTTAAAGAAGAGCTGCAAAAGAGCCTGTACCCACTCTCCAAATG
AGACCCAGCCAGCTGTGCTTTCTCAGTTAATCTCTTCTCTCTCAACTTGAAGCTGTCTGGGAATTGCTGTGTAGTAGATTATA
GGCTTCCCTCAGCTGGTCCATATAAAGCAGGAGGTGAGGGCCAGGCTGAGGAAGCATTTGGGAGGCAGATCCAGGCCCTAAGT
TGTGTGGAGACACATTTCCAGGACACAATAAGTGCATGCTGTACAGATTTGTCATCCGAGTATCGCAAGGTGGGAGAAC
AGAATCAGGTGTTCAAGGCCAGCCTCTCAAACCAAACTGAAGTAAGTACATCACTCTACTCTGCTTTTAAAGAGTTAAAAAG
GGGCTGGGAGATGACTCAGCAGTTAAGACACTGGCTGTCTACAGAAACACTAGGCTCAATCCAGCACCCATATGGCAG
CTCACAACTGTGCATGACTTCAGTTCCATAATTCCAGGGGATTTGTATGTTCCACAACAACATACATGAGGCAAAACAGCAATGC
ACATAAAAAAAAAATAATCATAAAACAAACAAAGAGTTAAAAGGACAGGAGAAGAGGAACAAGAGAAGGTTTCATGTGGCCAGG
TTTTCTTTCCCCAAATTTAAAGAGTTTCTTCGAGTTTATACCTCACACCCATAAGAGCTCAGAAGTCAACAAAGCCAGGAGGCT
TGATTTCATGAGAATCATTTCAAATTTCTGCTTTCTGAATATAAACAAAAATTAATTAATTCACATACCCAGGAAGTACA
TTACAGCCTTCAAATTCACCTCTGCTTAACAGTAACTCGTGAACGAATGCACAGAACAGACCCAGTACCCACCAGCACTATGCT
AAATGCTCTATGCACATTAACCTGAATGCTGCGCATGGCTGCGTGGCAGGAAATCATCCCATCGCCAGCAGATAGGAGCT
CTTTGCCACAGCCTCTTCAACTGCCAGAGAGCTCAGCTGTGACCTGTGATGCTGTAGTTACAGAAAGGTTTTCTCAACTCTCTGGC
ATCCTGAAAAGAAGTGGCTTGCTTTAAAGTGACTTTTCTTTCTTTTTCACAAACAGTGCAGGATGGCTCCTGTGCCAATGACA
GGTATGTGCTACCTCATCTAGTGTCTGGTAGTACGTGGATTTTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTGTGTGTGT
GTGTGTGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGTGTGAGAGCTGAGAGAGAGAGTGTGTGTGTGTCTTTCTTTGTGT
ATGTGTGTACTGCTCTTTCTGTGTGCACATATGTGCACCTGTTCTTTCTCTGTGTGTATGTATCAGCTCTTTCTGGGGGGGG
GTGTATGTCCCCCTGCTTCTGCTTACAGAGGCTAGTATCTCAAGCAATGAGTTGGTGGAGTACAGATGCTGCTGTGTCAGCTGT
TATGTGATTTGAAGTGTCAACTCAGCACACTGGTTTCTGCCCTGTCAAATGCTGCGATGACAGCATCCACTGGTAGCTG
AAGTGGGGGTGCTGCTCTCATCCACTGAGAGGGAATGATTTCTTAGTAGGCTGCGCTGGAACCTCACTGTATAGAAGTA
CACTGGGGGCACACAGGAGCATGGAGCCCCTAAGGCCACAGCAGCTCTGTGCTATCCCTCTGGCAAGGGGCCCTCTGTCA
AAGGAGGGGTTGAAGATGGGCCAGAAGAGGTTCTCTCAATCTCTGACCTTACAGGACTCTGATGATAAATGATACAGTCTC
TAGGCTATCTCGGCTTCATTCTTCTGCTGTGATAAAATGTCAATGGGGGAAAAAAGAGAGCTTAGGGAAGAAAGGGCTTA
TTCTGGCTCGAACTCCAGGTTTCCAGTCCATTACTACATGAAAGGCAGTGTGGCAGGAACCTTGAAGCACATGGTCACATCATATC
CTCCAGAGCAGTGAATGTAATCAAGGGGTGGGGAGCTGGAATGTGGCTCAGGGGTTAAGAGCATCGGTACTCTCCAGAGGA
TGCAGATTAACACTGTCTGTAATCCAGTTCAGGGAATGTGACACCTCAGCAGACATATCAAATAGACATACATGTGGGCA
AACACCAATGTACTTAAAAATAAAATAAATAAATAAATAAATAAATAGGTGCTTAGTTACTTTCCACCTTTAATCAGTCCAA
GACCCAGGCTTAGGAAATGTGTACCCACTCCCACTGGGCTCTCACATCAGTAAAGTAAAGCAAGACATCCCAAGCGGT
ACCCATAGGCTTCTGAGACTCTTAGCAAGCTGAATCAGGTTGTGTCAAGTTGCAATTTGAACATTAATGTGCTTAACTGC
TCCCTGATGAACAGGATGTGGCAGAGACAGGCATCCCATTTGGTTAATGTCAAGAGTGTATCCCTCGTGGACTGAATTTTGCTT
TAACTTATATTTATTTGCTTGTGTTTATAGTGTGTTATCTGTATGTCATGTGAGTGTGAGTGTGGGCTCCCTCAGAGTCAGGA
ATGTGTAGAATCCCTCTAGAGCTGGATAGGGGGCTGCGGGTATGGGTGCTGAAATCAAACCCGGTCTCTGGAATAAGCAGA
AGCACTCTGACTCTTAAATCATCTACTTAACCTCATCTGTCTGTCTCATGTTTAAAAATAGTTATAGTGGCCAGGTGGTGGTGGCG
TCGCTTTAATCCAGCACTTGGGAGGACTGGCAGGAGGATTTCTGAGTTCGAGGTGAGCCAAAGTGAGTTCCAGAGCAGCAG
AGGGCTATACAGAGAACCCTGTCTCAAAGAACAAAAATAATGAATTAATATAGTGGGTTTTGGACATCTCTGTATGTAA
GCACCTTCCAGATGGGCTCTGACAAGAGATCGTGGCTGACCACTGATTGAAATTAATGATGAAATTCAACTTTCAGAA
GCAAGGCTGTAGTTCTCTCTGTGGTCTTACCACAGTCAGTAACAGCTGCAAGTTCCTTAGAGAGTCAGTCACCTTAGTACATTC
CAGCGGAGCAGAGCATGATAGTGTCTCTTAAAGACGTGAAGGAGGCTCTTACCCAGCAGTCACTGCGGCTTGGTGCTT
CTGAAGCGCAAGCTCAACCAACGTTTCATCCGCGGAGCGCTCTCAGGCTCTCGCAGCAGCTGTCGCGCTGCGCTCAAAGTTTA
CGGTAAGCGCGGCGCTCAGGACGACCAGTGGCGCGGAAACACCGCGCGGCGGAATGCGCGGAATGCGCGGTGCGGCTGCGCGG
CTCCCCAAGCCGTGACCCGAGGTTCCCGGCGCGGTTTGTGGGACCGGGAGCTAGTGCCATGGGTCGCGCGCGCTCCAGC
CACCAGCACAGGAGGAGGCGGCCCTACGGAGGCTCAGACGTGAGGCTAGACAACTTTTCAAACACTGGGGCTAGGTT
GCCCTCCCTGTTTGGGCTCCATCAGAGTCTGGAACCCGCTTAGTCCCATTTAAAGCCCCCATGTATCGGATTAAGAAATGGAG
ATGCTGTGTTTTCAGGAGAGCAGGTCAAAGGCTCTGCGCCTGACCGCCCTTCGAGATGCTGAGGACAGGCTGCGGCGGCTGA
AAGACCCAGTTTCCAGAGCTGCGCCTGGGATCGATGAGGTTGCTCACACAGTGTAGGCACTGGTCTGCTCGCCGCTG
GTGGCTCACTTGGCCGAGTGTCCCGCTCCCACTTTAGTCTGGGAAGGCGGAGGCGCAAAGCCCAAAGGACCTTAGGGTTC
TTACAGACACCTGTGATTCTGTCAGAGAGCTGGAGACGAGCAGACATCCCTCTTCAAATTTGCAATCTACCTTTCGGGGTCCCT
GGAGCCAGGCTTGCGCTCCAGAGCTCATTGACGCGCGCGCTCTATTGCTCTGGGTGGTGGATTTAGGAGTGAACATTTAT
GGTAAGGCAGCTTTGGGAAGATAGATGCGACGCTCCAGGTTGTGCACAGGGGATGAGCTGAGCATAACACCTTAGCCGAAGGTT

GCCTGAAATCCGCTCAGGGTAACCTAGGCGGAGCAGCCGTGTAGCACGTGGGCTGCCACGCGCGCCCCAAAACGCTTCTGGGTGA
 GGAGAGGGAAGCCGTAATGCCTCCGGAACCTTGGGGTCCATATTTCGGAAGTGTCTTCTCTGGGCGACTTGAAGGCTAAATTAACAA
 TGGCTAGCTGGAGCAGAAACAGCCAAAGTCTCTTCAAGTTGCCGCCAGGTATGCGGCTGACGGTGACCCCACTAGGTGCGTCCGCT
 5 CTTCTCCAGGAGGGGCTACAGCCAGAGGCTCAGTATTGCCGCCAGCCCGCACCCCTAACCCGAGCCCGCGCTTAGTCGCGAGG
 GTTCTCAATGAACGCGCTCCCTCCCACTTCTCAATGAAGTCCACAGCCAGGGATAGTGGCAACGCAAGACTAAATCTCCGCT
 CTCTTTGGAACCTTGGCTCCAGTCAGGTGGGGGTAGGGGTAGGGTTCGAGGAGGAGGAAATCCGAAAGGGGATTAAAGTTACTTT
 GAGATTTTCTTTCCAAATAACGTGGTCCCTCTCGGCTGGGCAAGTGGCTTTTGTCTCCAAAGGTCAGTGACAAATAAGCGCAG
 AACACTTTAAGCCAGAGCGGACAGTTCCTGCCACGAGATTCTTTTAAAGCCAATGTAAAGTTAAATTTGCAAAAGAAAGTGGGT
 10 GTTTGTGTTTAAAGTTACTATTTCGCTGGAATAAATAAATCAAGTCTTTCTCTGAGATTCTTAAAGCAGTTGTCCCGGAAAGAAC
 TCTGAATGCGAGCCACCTCCTGGGCTCGGGATTTCGGAACAAGAGGGTTCAGGATGGAGGATGGGCGCTCCCGCGCGGGTCCCA
 AATTCCTGCGCTCCCTACGGGTCTCTGGACGGCTCTACACGCCCGCAACCGGACTTGCATTTTGTCTCTCCCTGAGCGCA
 GAGCTCAACGAAGTTCCTCGTGGAGATCTGCCGGTCCGCTAGTAACAGCACTGAGTCCGGATTGGCTCATGCAAAATTCAGTTT
 CCTGGTCTTCCCGCGGTGGCGGTGGTGGGGGGTGGCTGCGGGTCTAGCTCGTGTCTGAGGGTGGGCGAGCCCTTTATGCCCC
 15 GCTGCCCTTGGTGGCGCACCTTGGCTAGGCTAGCTGCTCAGTTCAGGCACTCAGCGCGGGTGATAGCGCGAGCCCTTATGAAA
 TCATGCTTACTGCCCGCGGTAGGGATTATTAATGAATGAAAGGACGCTGGCGCCCTCGTGTCTAGGCTAAGGCTCCAGGCTTG
 GCGGGGCTGTGGCAGAGCAAGCGTGGGCACTCTGCCGGGCGACCCACCACTTCGGAGCTACAGTGAATCACTGTCCCGAAG
 GGTCCGGACTTTAGGGACCCCAATGTCCGGGGAGGGGAGCGAAGGCATGAGCTCGGAAGTGAGGGTGTGCGTCTGTGTGCGC
 GCGTGGACGCGGTGCGCTCTTTACCACTTCTCTGGGACAGAAAGTATTCCGTGGGAAATGTGTGTGAATAGTTCGCTAGCTAGCT
 20 TGAAGTCCGGTATTGTGAAACGTTTCCAAACTAGGGAACATAAATAATGAGCAAGGTTGGTGAACCGCTTTATTCTAAATAAT
 TTTATTGAATCTATAAATTATAAATTAGGAGTCCATTAGTTAAACAGCACTCTATAGATTCTCTTTAAATATCACCTTATC
 GGCTCACAGTTTATCTTGATTCTCACCAGCGCGCCCGCCCACTCAAGACTGCAATTTAAAGGTGGAGAAACACCAAC
 CCTCAACGAAGCAATCAAGAAGCTTCCGTGGTCTGGTCTCTGGAAGGGCGACTAATAACTTGCAGCGATTACTTTCTTAATT
 AAAAAATAAATTAGGAAGGAGCTATCGTGTCTCAACCTTTCTTCAACGGTTTATTTTCTTGGGCAACCGCTGCACTGGAGG
 25 AGGGGATACTGGGGGACCTGGCCAGGATAAACCGGCTCAGTGTATGAAGACAAATCTCAGATCCCAACCCCGAGCGGAGGA
 GGAATAGATGAAATAATGGCCACCATCTTGAGCTGTGTGCTGGAATTTTGGGGTCTTATTTATTTTGGAGCGAGCGCATGCTAGG
 CTGGGGATCTTTAAAGTTCAGATACCCCTCTGGCCCTTTCGAACCAACCCAGTGCAGCGAGGATGGAGCTGACGAGAGCTTAGG
 GCTCGTGGCATCTTCCGGGTGTACACAGTCTCTGAATTTTACAGTGTGTGATGAAATGAAAGAAGACAGGAGCGTGGGATT
 CTAAGCAATGGGTCCGCTGTGGGTGCTCGTGGCGTCTCGGAAACGACCCATTCTCCCGGTTTAAAGAACAGGGTGTCTTGCA
 CCCCAGGCTCCCTTCCATACATTCTCTCTGGCTTGGCTGTGGCTGGCTCCCTCTCTAGCTGTCTCTGTCTCAGAGCGGCCA
 30 AAGCAGTCCGAGCGATTGTCATATCTACGAAGGCTGAGGGGGAAGGGNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 NNN
 NNN
 NNN
 35 NNN
 NNN
 NNN
 NNN
 NNN
 40 NNN
 NNN
 NNN
 NNN
 NNN
 45 NNN
 NNN
 NNN
 NNN
 NNN
 50 NNN
 NNN
 NNN
 NNN
 NNN
 55 NNN
 NNN
 NNN
 NNN
 NNN
 60 NNN
 NNN
 NNN
 NNN
 NNN
 65 NNN
 NNN
 NNN
 NNN
 NNN
 70 NNN
 NNN
 NNN
 NNN
 NNN
 75 NNN
 NNN
 NNN
 NNN
 NNN
 CTAAGGGGTGGGGGTGGCCCTGCTGGCAGTCAGGAGGACAGTGGCTGGGGTCTCTCTGAGGAGAGCGGAGCCTTTGGAAGCTCCA

247

248

249

TGATTCTGGCACATTCTTGCCGCTGCCCAAGTTAAACAACAGTAGGTAATTTGCACACCTCTGGCTCTGTGCCTTTCTATTAGGA
 CTTTTTGGCAAAAGGTGGAGAGCGGGAGGCTTAAGAGGGGATGTGAGGGAGAGGTGAAGGTGGGACCACATGGGACAGGCCACGG
 CTCCTCTCATGGCGCTGCTACCGATGACTCCAGGATCCAGGCGTTGAGAACAGATTCTATTGCTTTGTATCTTTACAGTTGT
 TTTCCGTGCTATTGGAGGTCAAGTTTGTGTTTGTGTTTCAATGTGAGACTGCCATGTTCAAGTTTAAATTTCTCATAGAG
 5 TGTATTTACAGATGCCCTTTTGTACTTTTTTTTTTAATGTGATCTATTTGGCTTAATGTGATTACCGCTGTATTTCAAAAA
 AAAAAAAAAAAAAAAAAAGAGGTTCTGTTCAACATACCTCATGTATCATCTAGCCATGCACGAGCCTGGCAGGACAGGTGGCGG
 TCTGCCCTCCAGGATCTCGGACCCCTGATGGCGATCGTCTGTGATGCTGGGCCCTTCATTTGATCTGGGACATAGCATCACAGCG
 GTCAGGGCACCTGGATTGTTCTGTTATCGATAATTGTTACTTGTAGCGGCTGTGTGTCATGCCACCATGCTGCTGGCCCGGAGGGA
 TTTGCTCTGAGTCTCCGGTGCATCAITTAATCTGTTAGGTTCTAGTGTTCGGTCTTGTGTTTGTGTTAATTACAGCATTTGCTAAT
 10 GTAAGACTCTGCTTTGCGAACGACGCTGAGTGTAGGCGCCCAAGTTCCCTAGCAAGCTGCCAAACCAACCGGCACAC
 CAGCTCAGCTGAGGCATCCAGCCAGGACAGCCCTGAGGGCCGCTGTGTCCATGGTGTAGGGGTGAGGTTTGGCCAAAAGGCC
 ATAGACTGTGTGGGTCCACGGAATCTGCCCTGTGACATGAAAGGCTTTGAGGACTCTGGCTGGTGGCCAGGTTGGCTTTTGTGTA
 TTTCTGGTTGACACCATGGCGCTTCCAGCACAGACATGTGACCAGCATGGTCCAGGAAAAAAAAAAGACAAAAATCTAGAAA
 ATAAAAATGGTAAAAATCTCAAAAAAAAAAAAAAAAAA
 15

MOUSE SEQUENCE - CODING
 ATGGAACACCAGCTCCTGTGCTGCGAAGTGGAGACCATCCGCGCGCGTACCCTGACACCAATCTCCTCAACGACCGGGTGTGGG
 AGCCATGCTCAAGACGGAGGAGACCTGTGCGCCCTCCGTATCTTACTTCAAGTGCCTGAGAAAGGAGATTGTGCCATCCATGCGGA
 AAATCGTGCCACCTGGATGCTGAGGTCTGTGAGGAGCAGAGTGCAGAGAGGAGGTCTTCCCGCTGGCCATGAATACCTGGAG
 20 CGCTTCCGTGCTGGAGCCCTGAAGAAGAGCCGCTGCACTGCTGGGGGCCACCTGCATGTTCTGGGCTCTAAGAGTGAAGGA
 GACCATTCCCTTGACTGCCGAGAAGTTGTGATCTACACTGACAACTCTATCCGGCCCGAGGAGCTGTGCAATGGAAGTGTCTT
 TGGTGAACAGCTCAAGTGAACCTGGCCGCTGACTCCCAAGATTTTCATCGAACCTTCTCTCCAAATGCCAGAGGCGGAT
 GAGAACAGCAGACCATCCGACGATGCACAGACCTTTGTGGCCCTCTGTGCCACAGATGTGAAGTTCAATTTCCAAACCCACCTC
 CATGGTAGCTGTGGGAGCGTGTGGCTGCGATGCAAGGCTGAACCTGGGCGAGCCCAACAACTTCTCTCTGCTACCGCACAA
 25 CGCACTTTCTTCCAGAGTCACTAAGTGTGACCCGAGCTGCTCCTGCTGCTGCCAGGAACAGATTGAAGCCCTCTGAGAGTCAAGC
 CTGGCCAGGCCCAGCAGAACGTCGACCCCAAGGCCACTGAGGAGGAGGGGAAGTGGAGGAAGGCTGGTCTGCGCTGCACGCC
 CACCGACGTGGAGATGTGGACATCTGA

HUMAN SEQUENCE - GENOMIC
 CATGCCCTGTAATCCAGCACTTTGGGAGGCCAAGGCGGCGAGATCACCTGAGGTGAGGAGTTCGAGACCAGCCTGGCCAAACATGGT
 GAAACCCGTCTCTACTAAAAATCAAAAAAAAAAAGAAAAAAGAAAGAAAGAAAAATAGCTGGGCATGGTGGCGCATGCCCTC
 TAATCCCACTACTTGGGAGGCTGAGGAGGAGAACTGTTGAACCCAGGAGGTGGAGTTTGCAGTGAGCTGAGACCCGCCACTG
 30 CACTCCAGCCTGGGAGACAGAGCAAGCTCTGTCTCAACAAAAAAGAAAAAAGAAAAAAGGGGAAAAATCACTCCAAT
 CATCCCAAGTCTCAGCTCCTACTCTTTTGTCTATATGCTCTCAAAACAGCTATGTATTATTTTGTCTGAATTTATGCTGGTTTTAT
 CTTTGTATTTGCTCTTTTTCATTTAATGTTTTTCCATCCAGTGAACACACCTAATTTGCCATTCCCTCTTCTGAACATGAG
 35 ATTGCTCTAGGATCTCTTGCAAATAGGATAATTGTCAATGATGTAACGGGTCTCTATGCAACTTGCAAAAGTGAATCAGTCTTG
 GTGCTCTCTATCTAGTGTGTTGGTTCCAAGCAACAGAAACCAATGCTGGCAGATTTCAGCAGAAAAGGAAAAATCAGATGCAGAA
 GATAGGCAGGAACAAGGGAGGCAAGACAGCAGCAATCAATGGAAGCATGTGTCAGATCTTCTCTGATGAGAAGCCAGGGCTACC
 CCTACCCATCCCAACCCAGACCCCTCCAGTAAACTGTCAGCGGCCACACCACTTGTCCAGAGAGCCACAGCTATGAGTGGC
 40 AGCAGATAGTCTGCTCATAAATTGAATGCTCACCAGTCTTACACTAGAAAACATTTCTACCTTTTCTGATTCTTCCCAC
 CACCACTCCCAATTCAAAATCTTGATCAAAAAGATGAATGTATAAATAACTATTTATAATGACATCAAAATATCAAGTACT
 TAAGAAGAAATCTAATAAAGATGCACAAACCCCAACACACACACACTCACACACACACCTGCAATTAAATTAAGGACAA
 TCTAAATAAACAGAGGTCTATATCATGCCATGAATTGAATGACTCTGTAGTAAAAGTGTCAATTCCTCAAAATTGATCTATAG
 ATCCAATACAAATCCCAATCAAAATTCAGCATTGTGTGTGTCACATGTGTAAGTTGATTCTGAAATGTTATGAGAGCCCCAAGG
 45 CCAGGAGTAGCTCAGGCGCAACATAAAGAGAAAGTGGTTGGAGGATTAGCCCGCCAGATATCAAGAAATCGTAGGCTATAGCTTC
 CATGATGCTTCTGGGGTAAGGACTGAAAAGAGACCACTGGAACGGGATAGAAAGTCCAGAAACAGAGATTTTGTGTTAAGTGAGC
 AGATTTTAGCTGCTCTGTTTCAAAAAAAGTAATATGTGAGATGACAGGTATGTTACACTAATTCATATGGTAACCAATTTTAC
 TATGTATATGTATCTTATAACATCATGCTGTCAAGTTTATTTCAAAAATAAATTTACATAAAATCTTAGCAGTGTATTTCATAAT
 50 AGCAAAAAGTGGGAAAAATTTCTATTTTAAAGTACAGAAAATTTCTCTCAAGGGGAAATAGGTTAAATAATAAGAGAA
 GAATTAAGGCCAGGTGTGGTGGCTCATGCTATAATCCAGCACTTTGGGAGGCCAAGGCCAGAGGATTACTTAGGCCAGGAGTT
 TGAGACCAGCTGGGCAACATAGTGAGACCCCATGTTTACAAAAATTAATAAATAGCTGGGTGACGTGACAGTGCCTATAGTCTC
 GATAGCTTCTGGGAGCGAAGGCAGGAGGATTGCTTGAGCCAGGAGGTCAAGGCTACAGTAAGGTATGATCGTGCCATGCATCC
 55 AGCATGGGCAACAGAGCAAGACCTGTATCTAGGGGAAAAAATGATAAGCCTTGTGAAAGAGAAATGAAAACAGCATCCACACA
 TAAACTTGTACCTCTGTGTTTCATCGGAGCATTGTCCAGTAACCAAGGTAGAAACCATCCTAAGGCCATGACTGATGAATG
 GATAAGCAAAATGTGGTCTATCAATACGATTGATAGTATTCAACCTAAAGAGGAATGAACCATGGACACATGCCACATGTGGGCC
 TTGAAAACGTGATGCTAAGTGGAAAAAGCCAGATGCAAGAGGCTGCATAGCATATGATTCCATCTGTTGGAATGTCCAGAAAAGG
 CAGATCCACAGAGAAAGATTAGTGGTTGCCAGGGGCTGGGGAAGGGGGAAGAAAAGGGTGAATAACTACAAATGGGTACAGGGT
 60 TTTCTTGGCGGATGATAAATGTTCTCAGATGGTGTAGTGGCTGTCCAACTAACAAAAATCCATCGAACTATATCTTAAACG
 AGTGAACCTTACGGTATGTAAGTTATTTTCAATAAAGTGGTTTCAAAAAATAAAGGTGAACCTACCATTCTAGGTGCTTT
 GGAGTTTACCGTTTTTCTCCTTGCACTCTGGAGTCAAGTGTGAGAGGCTCTCAGCTCTACCAAGCTGAATGATGTGTTGGGCTT
 CGGTTTCTCATCTGTAATAATGGGATAAAGGGCTCTCCTTGGAGCTGCCATGAAGATTGAATTAGATGCCCTCTGTGAAGATGC
 AGGCAAGGTGGAGAGCACAGTAAGCGTCTCGGGGGGCCAGCCATCACCGCCAGCAGGGCTCACCAAGTATCTTTGGCCAGAGAATA
 65 GCCGGGCTTAGGGAGCAGCCAGGGTCTAGGGAGAGGGCTGCTTCCCTGTGAGGCTCCTAATTTCCCATCTCTCCTCTGTTTC
 TCCCTTCCCAACCCCTTACTCCTGGAAGTGTGACTCGCTGCTCCTCCCGTACTCCCTACATTGCATCTCCCAAGTTACTGTG
 TTAATCTCTCATCTCTTTTCCAAACAGCCTCTGTCTAGCACCTTGGAGTCTGATGGGAATTCATGGGTGGGTGTTTCAAGCT
 TGGCTTCATCAGATGACAACTAAAAGGCAGAGGCTGGGGGGCAAGGAGCTCCAGGATCTGTCTCCCTTTGGAGAAGCCAGGT
 TCACCTTCCAGCAAGCTGCTCCGGCCCCACGCCCTGGCCCTCAATAACCTTCAGTGGCTCCCTTTTGCAGTATAATTCCCT
 70 CTTGGGATCTACAAAAGGGATTCCAGAGATTTTCTTCAATAACTCAAAAGGGATGGAGTAACGATATATGTGCCACAGCAAA
 GGCAGCTAAGGAAGGCCCTCAGGCTTCTTTGCTTTGCTTGAAGTATACCAACCCGAGCCCGAGGGGCCAGCAGAGAACCAAT
 GCTCAGAGCTGGGGGCCAAGGAATGCTTTCCAGGCTGGCGTCCAGGAGCCCCCTCTCCCTTCCCTATAGCAAGATACTAAGA
 GCAGAGGCTGGCTGGCAGGCGTGTGAGGCGCTGAGCTTCCATGGCTTGGCAGCTTCTTGACAGTGTGCTTTTGTGTTTCCA
 GCACTGACACTCACTAGCCACACCTTTGGCCAGCGTCCCTTGTGACTGCCCTTCCGCTTGGAGCAGAAATGGCTCCTATTACACA
 ATGGGTGCCAGGAACCTGGCCAGTCCATCCAGAGACAGGCGAGAGCCCTGGGCTACCGACCTCTGGGGCCAGCAGAAACCCCTCC
 75 TATGGCTCTGCTCTCATCTGCGATTGACACTTGTGCCCTTAATTAAGTGTCTTTTAAATCAACATTTCTACTCCTTTTG
 CAGAGTAAGAGAAAGAGGTTAGGGGAGAAGAAAGGAAGGATTCAGGGGTATTTTCTTTTTCATGTAAAGTTTGTTC

CGTGATTAAATCTCATGTCCACAAACAGCTCAGGAGAAGTCAGCATAGAGAAGCAAGCTGACAGATTATAAAGTCATTGTGAAAA
 TCCTCTTTCTGCATATAAACTGAAATGTGTAATTAATTCACATCTGCGTGTGGCACATGGCCTTCATCCTGCATAAGAACAAAT
 ACATGAATGAATAAATCGAGCAGGCTTGACACTCACCAGGCCCTGTGCTAAATGCTTTCTACATATTACCTTAATTAATCTCTCAC
 CGTGGCCTTCGCGAAGAAAAACGATCACAGCCGCTTTACAGATGGGGACAGAGATTTGTCCAGGCCACACAACTAGTGGCAGATGT
 5 AGGTCTGTATGTGACATTCTTGTTCAGTTTCATAAATGTGGCTGCCACCTGCGCTGAAATTTTGGGGAAAAAAGTGGTTTGGCT
 TTGCATGAATTTCTGAAAAAGTAGATTTTATCTTTACCAGCTTCTAAGCAAGCTGGATTATTTCTGACAGTGTCCATGAAATGGC
 TACAGACCATCACCGTTGCCAATGTGTGAACCTGAACAAGGCACCTGGTTTCTCTGTGCTCGGTTTCTTACCATTAAACGCAT
 TTCCCTGAGATTAAAGTGTGTGAACTATAAGTTGGCTGGAGGAAACACCTCATAGAAGTGAGAAGATGAGGATGGGTGGTGAGTGA
 AGGCTTTTCTCCAAACCTCAGAGAGATGGACCTCAAAGCAAATGGCCATGCTTCCCTTAGACTGGGTGAAGTGGTGTCTCAG
 10 GGCTAGAAGTGTGTCTAGAAGCATGGGGACCAATGCAGCCCCCTCCACCTAGGGCACATAACCTGTCTCTCTCCCATAGGATAGC
 AGAGACAGCTCTCTAAGTCAGGATTACAGCGAGATGGTCCAGGAGGGGCTAAGGATTCTCTGACTTATCAAAGCTGGGGAGGCA
 ACACAACTAGCTGTGTCTCAGGGGGCCCCAATCATGCCCTGAACCTCATGAGCCAGGCGAGGATCTGTGTGTAAAGGTGGC
 CTCAGGCTCAGGGATGCACTAGATTCTTTATCTTCCGAGCTTTCCAGCCACAGTGCATGGAGCCCATCGAAGGCTGCAGCTGCTA
 CACGTTTCTCTATTGTGTAAGCACCTTCTGTCTCGAGCTTTCCAGCCACAGTGCATGGAGCCCATCGAAGGCTGCAGCTGCTA
 15 TTTGGTGTCTTACCACCGCTGAGAAGGTGGAATGGTCAGGCCCGGCTTCTGTCACTTTCTTCAGCCGACAGTCCGCTTATTACGG
 ATTCCAGTAGGGCCGAGCACACTCCTTCTGCCCCGTCTTTACAGATGAACATGCTATCGTCCAGCAGTACAACCCGCTTATTAC
 GTAAAAAAGCAGGCCCTATCTACCCGAGGGAAGGAGTATGTTCCGACACACAGCTGGAGTGGTGTCTCGAGTAAAGCTCTGGGA
 GGTCGCGATGCGCTCCGGAACCGTAATGCGCGCTTTTCTAAGCCTTACGGTAAACGCGGACGAGGGCAACACAGTGGCGGTGGA
 ACCGAGGCCCGGGGGAATGCGCGGAATGCGCGGCGCGGCTCGCGCGGTTCCCGAGCCACGGCCAGGGTCCGCGCGCGCGCT
 20 CTGCGCTCTCCCTCACCTCTCCAGCCGACCCCGGCTGGCCCTGCGACCCAGAACTCGCTGGGCAAGTCTGCGCCCGGTG
 AACACACAGAAGGGCTTGGGACCGAGCGCGGCCCATCAGTCCCTCAGACCTGAGGACCCAGAAATCCCTAAGGGGTCCGAATC
 CAGATCTGCCCCAGCCCTTAAGGACAGGGCTCCAGGACCCAGGGGAAGGGCGCGGGCATTAGGTACGCAACCCGCTTTCCCT
 GCACCTGGAAAAAACTCCCTTCCCTCCCTGCTTGTGTGAGTGTGCGGATAACCAAGAACTCTAAGGCGCCCGCTTAATAAC
 GACCCCGCTGTCTCCACCCACCCCAAGTGCCAAAGCGAGGGATGGAAGCGCTTCAAGCGTTCGAAGGGCATTGAGGAGCGAG
 25 CTGGAGAGGGCGGGGATGCGGGGTCTCCCGCAGTCTTCCGGAAGGGCGGGGAGGGCGCGGCAAGTTCGGGATGGGGCATG
 CCGTGGAGGACCGAGGGCTCAGCGCGGATCTCCGCGGAAACCGGCTCCGCGAGCCGCGCGCCGCGGCTTCCGAGTGGCC
 GCGAGTCCCGCAGCGAAGCCTGCGTCTCCGTCGAGCGGGGCTGCTCAGCCTCGGGTGGGCGCGGCCAGGCTGACTGCGG
 GGGAGAGGGCGAAGCTGACCTCCGAGGTACCCCGCAGCAGCTTCTCTCTGTGCTCGGAAGTGGTTTCTTCTCGATCTGGG
 30 GGTACAGCGGATGCGTTTGGAGGGCGGAGTCTGAGGAATTAGAATCGCTTTAACCCTCAAGAGTGTGCGCTTCCAGCTCGGGA
 TCCAGATGCGTCTGAGCCAGGGCCCGCCCCCTACCTGTTGGGTTTGGCTTTAACTCCAGCGCACACATGCGCGCAGCCCT
 CGGAGCTAGGGAGGGGTCTCGTTTCCCGCAGCCCGCGGACAGCAGTGGGCGAGGGCGGGTGGCAGGGTGGTCTGTG
 TGTGGCTGAACTAATTGATCTGGAGCGGAAACGACGCTCGAGTGGGGCGATGGGGGGCGGTGCGGTGCTCATGTGCGGA
 GCGTGTGGCTGTCTCGGGTGGGCACTGGGGCGGAGTTCGCCCCGCGCCACCTCGCAGTTTGGGGCGCTGGGATCGGCGCTACG
 35 TAAGCGAAGCAGAGCTGCCATAGCACGTGGGCGCCACGCGCACCCCAAAGCAAGCAGTGTGGGGGAAGGGAGCTCGAGCGCC
 TTCCGAGCCAGGGGCGGCTTTCGGAAGCGTTTCCCGCGGAGCTTAAGGGCTTAACAATGGAAAACTCGCGGAGCTGAGCCAA
 GTCCTTTCAAGTCGCGCCAGGTATGCGGCTGCGAGTGACCCACCTGGGTGCGCCCGCCGCGCAGCCGCTTGGTGAAGGCGG
 GTGCGGAGGTGCGTGGCGAAGGTGCGGACTGGTCCCTGCACACCCGCCCCCAACCAAGCCCCGAGCCCCGCGGCGCGCAGCC
 40 GCGCTAGTCCCGGGTCTGCGTCCGCGCGCGCGGCTTCTGAATGAACGCGCTCCCTTCCCGCGCTGAATGAAGCTTCTGCTT
 CCAGGGACGGTGGCGAACACGCGCTGCAGCGGAATCGCTTTCTCTGACCGACCATCGCCCGAGCCGCGGTACCGGGGCGGG
 GGGCAGGGGGCGAGGAAAGCGTGAAGGTGATTTCAGTTAATTTGGATTCTTTTCAAACACAGTGGTTACCTCCCCAGTGGGCG
 ACTTGGCTTTGTCTCCAAATGGTCACCAAGAAATAAGAACAGAGCACTTAAATGAGCCAGAACTCCGACGCTCTGCTTCTG
 TGGGTTTTAAGAAGACAGTGTAAAGTAAACTGCAACCGAAAAGTTTTTAAAGTGTCTTTCTCTTTGGAAAAATAAATCAAA
 45 ATGCTTTCTCTGCGCTTCTTGAAGCAATGACCTCAAAGCCAGAGGTATTGGCCCCCTCGGGGACCCCGGGGCGCCCAAGCAG
 GGTCCCGCAGGTGGGGCTGGGCTGGCGTTCACCGGCTTTCAGCTAATTTGCGCTCGTCCCTGAGCCGGGAATCAACGAAGTTC
 CTAGTCTGAGTCTGCCCCGTGCGCTAGTAACAGCGCGCGCCCCATTGGCTCATGCTAATTCAGTTTCTCTGTCTTGGCCCC
 GGGATGGGGGGTGAAGCTCCCTCTGAGCCAGAGCCGGTGTGTCGGAGTGGGCGAGCCTCTTTATGCCCTGTCGCCCTAGCC
 50 GACTTCGGCCGCTTCGCGCTGGGCTGGGCGAGGCGCAGCGGGCTCGGGCCCTCGCCCCAGGGATGGGAGGGGCGGG
 TGATAGCTCCGGGCCCCATAAATCATCCAGGCGGCGCGGGTGGGATTTATGAATGAAAAAGCAGTGGGCGGCCCTTGTGCG
 CGGCTGATGCTCTGAGGCTTGGCTATGCGGGGCAACGCGATTGTGGGTGCTCGGGAGTGGGGGGGGCAGCAGCCGTAGGTG
 TCCCTGTGGGGCAACCATCGCTCCCATGCGGAATCCGGGGTAATTAACCCCGAGGACCCGGAATATTAGTAATCTAATTC
 CCGCGGGGAGGGGCGCGGAGGAATTCACCTGAAAGGTGGGGTGGGGGGGTGCGATCTTGTGTGAGCACCTGGCGAAG
 55 GGAAGTAAATGAACAGTTTCTTAATTTGGGGCAGGTACTGTAAAAATAAAAAAAGTTAAGACAGTAAATGCTCTTTTATTT
 TTTAATGACCAAGAGACAGAACTGTAAATTTAAAACTGTGATTTTAAATTTACATCTGCTTAAGTTTGCATAATATTGGGG
 ACCCTCTCATGTAACCAAGAACCTATCGATTGTCTAAAAATCAGATCAGTACACTCGTTTGTTAATTAATTAATTTGTA
 TTATGCGGCTCTGCGAGCCCTCACGCTCAGGAATTCAGTCCAGGGCAAACTTAAGGTGAAGGACGCTACACCCCAAA
 60 CAAAACCAATTAGGAACCTTCGGTGGTCTGTCCAGGCGAGGGGACTAATATTCCAGCAATTAATTTCTTTTAAATAAAA
 AAAATGAGTCAGAAATGGAGATCACTGTTCTCAGCTTCCATTAGAGGTGTGTTCTCCCGGTTAAATGGCGGACGGGAAGGG
 AGGGGGTGAGTTGGGGACCCCGCAAGGACCGACTGTGTAAGTAGGAAGGCAGCCCGAAGAGTCTCCAGCTAGAAGGACAGA
 TGAAGGAATCTGGCCACCATCTTGGGCTGTGCTGGAATTTTGGGCAATTTATTTTATTTTATTTTATTTTATTTTATTTT
 65 AGCTGAAATCCCTTTAACTTTAGGGTTACCCCTTGGGCATTGTGAACGACGCCCCCTGTGCGCGGAATGAACTTGCACAGGG
 TTTGTGTCGCCGCTCTCCCGCTTGTGATGCTAAATAGTTCTTGAATTTACACGTGTTAATGAAATGAAAGAAAGTGCAGTC
 GCTGAGATTCTTTGGCCGTCTGTGCGCGTGGTGCCCTCGTGGCGTCTTGGAAATGCGCCCATTTCTGCGGCTTGGATATGG
 GTGTGCGCGCGCCAGTCAACCTTCTGTGCTGTCCCGAGGCTGCGTGTGGCTGCGCGGCTTCTAGTTGTCCCTACTGCGAG
 AGCCACTTCAACCTCACCCCTAAATCCCGGGGACCCACTCGAGGCGGACGGGGCCCCCTGCACCCCTCTTCCCTGGCGGGGAGA
 70 AAGCTGACGCGGGCGAATTGCAATTTCTATGAAGAACCGGACTACAGGGGCAACTCGCGCGAGGCGAGGCGCGCGCTCCGGA
 TGGCTTTTGGGCTCTGCCCTCGTGTCTCCGCGGTTTGGCGCCCGCGCCCCCTCCCTGCGCGCGCCCCCGCCCCCTCCGCT
 CCCATTCTCTCGCGGCTTGTGCTTTGCTTAACAACAGTAACGCTACACGGACTACAGGGGAGTTTGTGTAAGTTGCAAGTTC
 TGGAGCTTCAGAGGCTGTGCGCGAGTAGCAGCGAGCAGAGTCCGACGCTCCGCGAGGGGCGAGAGGCGCGAGGAGC
 GCGGGGCGAGCAGAGAGGCGAGGCGCGGACCCAGCCAGGACCCACAGCCCTCCCGAGTGCAGGAAGAGCCCCAGCCATGG
 AACACAGCTCTGTGCTGCGAAGTGAAGCAATCCGCGCGCGGTACCCCGATGCCAACCTCTCAACAGCAGGGGTGCTGCGGGC
 75 ATGCTGAAGGCGGAGGAGACCTGCGCGCCTCGGTGCTTACTTCAATGTGTGAGAGGAGGTCTGCGCTCATGCGGAAGT
 CGTCCGACCATGGATGCTGGAGTGGGGGCTTCGGGCGCTCTCTTAAGACTTCTCTGCACTTGTGTGCGGACGCCAGTCTTCT

TTGCTACTACCCCCCTCCCTTCTCTCCGCTAGAACTTTGAAGTTTGGCGTGGTGTCTTAGGGATCCGTATTTTCAAATAAA
ATTGCGGTATTTTCTGAAGGAGGAAGGGGTGGGGTGGGGTGTCTAGAACTAGCGTTTCTGGGAGGGGAGAAGGGGTCCGGA
GGGGTGCCTTCGGGAGAAGCCAGTGCAGGGGACCCCAATGGGCGGAGGGTGGCGGTGGCAGGCTGGGTGCGCTTTGTGTC
5 CCGCTGCGCCCCAGCCCGCTGCGCTCAGCGGCGGGAGCGCCCAACTCGGGGGAGGGGCATAGATTTGATTTTAAATTA
ATATCCATGGACACGTATGCAAGGGCCGCTCGTGCAGTATTATGCGCCATCTTTGCTCTTTTATGCAAAGCAAAGTGTATT
AATAATTGGGGGAGGGTGGGGGCGGGAGCGGCCCGGGCGCTGGGCGCGAGCTAAGGGCGCGCGGTGCGGGAGCCCGG
GGAGGGGCGCAGGGACCGGCATGGTAGTTTGGGGGACCCGCTAGGGAAGGGGGGCTTTGTTCAAGCAGCAGTCCCGG
GCGCCCCGAACGGGACGCTGGGCGGAGAGCACGGCAGCTGCAAGGTGCGTGGCCCCAAGACGCCAGGGCTTGATCCCCGTC
10 TGCAGGATATCGGCTTGAGGACCTTCTCCGAGCGAGCGGGGGCTGGGAGCACATTTTCAGACCTTCGGTGGGCGCTGAGG
GCCCCAGATATTTAAATAATTTTGAAGTGGCGGTGGTGCCTTTCGAGAGGGAAACGCCGCCCGCCAGGGGGAAGGG
GGGGCCCCGAGTTTGAATTCCTGGGGCTCCCCCGAGCCTGTAAACGAACTCCCAACCCCGGCTGGGTAAAGGGTCCGCCAG
GGTCATTTTTCAGGGTTTTTTATGCACTTAGTTATTTTAAATATTTTAAATATTTTGAAGATGACGTCTGGGGAATGC
15 GCGCGCGCGCTGGGACGCCACCTTTGTGTCTCGCAGGCGCGGCCCAACCCCGCGGCCGTTCCGCGGCCCGCACCCAGTT
GGTGTGACCCCCAGTCAGAGGACACCGAGCTCCAGGCGGGCCAGGGTCCCGGGGGCGGAGCCCGCGCGCGCACGCC
GCCCAGCTGTGCCGCTCCCGCCCCACCGTGCAGCCTCGCGGGACTTTCCTTTTCAGTTTCGGGAGGGTGGGTACTGGGGAC
GCGCGGGGAGGGGGCGCATCACGGGAAGCTCTCGCCCCCAGCCCCAGCCCTCGGCGCCCTCCAGACCTGGCGGCCCTGCCA
AGCGCGATGGGGGTGCGGGGCGTGGGGGGCGGGCGGCTGGCGGGCGCGGTACGCGGCCCGTCCGCGGCCCGTCTGCG
AGGAACAGAAGTGCAGGAGGAGGTCTTCCGCTGGCCATGAACCTACCTGGACCGCTTCTGTGCTGGAGCCCGTGAAGAGAGC
CGCTCGAGCTGTGGGGGCACTTGATGTTCTGGGCTCTAAGATGAAGGAGACCATCCCCGAGCGGCGAGAGCTGTGCAT
20 CTACACGCAACTCCATCCGGCCGAGGAGTGTGTAACTGACCTGACCCCGGCCCGCCCCCGCGAGCGCAGG
ACCACGGGGCGGGGAGGTGCAGGCGGTGGCGGCCCGCCCTCTGACATATCTGCTCTCGAGGGAGGGCGGCCCGCGGCC
GGCGTCCCTGTTCGGGGAGCGGGCGGATCTAGCGCCCTCGTCCCGCGCCCTGTGTGCGCTTGCCTGCGACTCCACCGCT
TCGCGCCCCGCGGTGTGGCGAAAGTGGCGGCGCGGCCCTTCAGCGGTGCAGGAGCGCGCGCTCGGCGCTGAGCCTCC
25 AGTTCCAGGTGGGGAGGTCTTTTGTTCCTTTCAGTTGCAAGTCTTTTCAGCGCGGGCGCTTTTCTGTGTGATTTG
CGTGTGCCCCAGCTCCCTTGAAGTCCCGAGCTTCCGAGCCCTCCCTCCAACATCCAGGACCGCACGAGAGCGAGGGCCAGTG
CTCTGAGCGGAGTGGCGGTGGCCCCGGCCCCGTGCTCGCGGCTTCCCGCGCCCCGGGCTGGCCCCACCTCCCTGATGGC
CGCTCACCTGTGTTTCGAGCAAAATGGAGCTGCTCTGTGAAACAGCTCAAGTGGAACTGGCGCGCAATGACCCAGATTTC
ATTGAACACTTCTCTCAAATGCCAGAGGCGGAGGAGAACAACAGATCATCCGCAACACGCGCAGACCTTCGTGGCTCTG
TGCCACAGTAGGGCAGGCCCGGAGCCCCGGCTCCCTTGAAGAGCGGCTCCTTAGGTGACCTGGCGGGCTTCTGTCTCC
30 ACTGGGTGCTGTCTGGGAAGATGTCCCGAGACCCCTCTGCGCTGGAGAGCGCTCTTCAGCTCTGTGTGAGCAGGCGCTGA
TTGTTGTGCGCTGGATGGAGGAGATTGCTCCTCACGCCACCATGCAGTACCTTGGGCAATGGTGTGGACGGCTCAGCTG
CTGTGTCCGTTACTCTGGCTCGTCTTACGGCCAGGCGAGCTGTGGCCACTCCATGTGAAAGGGGTTTACTTGGCCACAGG
GCCGCTCTCTTCTCCACCCACCTCCAGCCCTTCTGTGTCTCTAAGGAGCTGAGCTGCAGAGGCCCTCTCTGGCTCTCCAG
GCTGGGCCACCTGCCAGAGGCGCTCCAGGGGCGGGAGAGCTGTGGCTGCTGCACCAGTGTCTTGGGCGAGCGAGTGCAGG
35 GGTGTCCAGCAGAGGAGCTCGGCTGCTGAGGCCCTGCCAGGGGTGCGGCGAGCCAGCGGGCTCAGCTGAGCCCTGAGGGGCGC
TTCAGAGCACTCTCAGCTTGGGCCCGCACCGGTGGGACAGACTCGACATACAGAGGTGCGGCTCTGCTGTCCCGAGCCCTGCC
CTGTGACATGGCTTGGCCCCAGAACCCAGTGGGACAGACTCGACATACAGAGGTGCGGCTCTGCTGTCCCGAGCCCTGCC
TCTGACCCCTGTGACCGCTCTCTCCCTGGCCAGGAGGCTGTTACCTTCATGGGGAGCATGGCCCCATCCACCCAGCTC
TGCTGTGGCCACCTTTGGTCAAGCTCAGTTGTACATCTGTTGGGGCTCACTTGGGTGACCTAGGCGCACAGGCCACGGG
40 GCATCAAAGAGGCGAGTAGCATCTTCTCCCTCCCGAGGGGAGAGCCCGCAAGCTACTTCAGAGCTCCCTTGCACACGGTA
GCCCGCAGCGGTATCCAGAATGGGTCTGTGTTAGGCGTGAGGCTCCCGACCTCTCCACCTGTCTGGGGCATGAACCCCTC
CCCCAGTTTCAAGCGAGTCCCAAGGTGGGAGATGAAGTGCAGAGGATGTGACCCAGTCTGGATGGGTCTGGGGTGGGGG
CATTGCGGACAGAGGGGAGGCTTCTGCTGCTCTCAGAGGAGAGAGGCTCCGAGACTCCAGACAGCTTTATGGAGG
TGAAAGTGGCTTCAGAGAAATGCAAGTTTCTGAGAGAACTGGGGCGTGGTTCTTGACAGCTCCCTACAGGGTGGCTCCAG
45 CAGTGGAGTCCCTCCAGGACCCCTGGGTGCTAGTGGGAGGAGTGGGCGAGTGCAGATTCTCGTCTCTCCACTACTGCACAC
CTTTGTCTGCAAGGCGCCCCAGCGGTGGGTGAAGGAGGAGGACACTTGGGACCCAGCTGTGCAAGCTCTCAGTAATGT
GGAGTCCACTCCAGGGTGGGTCCGAGGAGGGGAGGAGACAGGGGACCCCTGCAAGTGTCTCGGGTCTGACCCGTGG
CCACCCCATGGAAGCTAACTGAGCAGCCAGTGCCTTGTCTCTGAGACATCTGTGGAGACAAGAGTGAAGTCTGCTTAAAG
TCAGAACAGGTGAAGAGGTGGAGGCGTGGGAAGAGTCTAGGAAGGTGTTTTGCCCTCCAGTGGGCAAGTTTACATTTAA
50 GGTGATGCTGGGTGTTCTCTGCACTAGGCACTTCTGGCCCCAGGTCCCGAGCAGGTGTGCACATGTGCATACACTCAGCATG
GGGGTTTCAGGGCAGGTGCGCCCTTGGCTCCGTGGGAGGCGAGGTGAGGAACGTCAGTGCCAAAGGAGCTTCCGGGACAGCTGCA
CTTCCCTTTACAACAGGCGAGCGATAGGTCAAATCTGGAGCTTGGGTCTTAATCTGGGTGGCTCTTAAGCAGAGTCA
AGCACACACACTGGGGTGGGGGACGAGCTTCTGAACAACTGGGCCAGTGACTCCAGCTGTGTGTGCCCTGGAGAGCGGG
GGGTGCACAGGTGCGGAGCCAGCTAGAACCTGTGCTCCCTGAGAGAGCGGTTCTGTGTGCGGTTCTGATTGCTCAATGAGA
55 AGGTTTTTCATTATGGCTCCCGGCTCTCAGACTGGGTGGAAGTGTCTCCATTTAAAGGGGAAAAGAGGTGCTCGGCTCGTTAAGG
ATTTCTTTTCTAAGTTGTACGGCGCCAGCAGCCGGCTTTGTCTCCCTTCAGGGTGGCTGCTTTCTTCCCGGCCCTCCCGG
GCGGCCCTCTCTTAAACAGGCGGAAGTTGTTTATCTCTCGGGATGAAGTCTCGGATGGGCGGCCACACCCCTGGCGGCCGTGG
GGGCCCCCTCTCTTTGTGCTGGGTGCGCTCCCATTCAGCTCCCGGACCCCTTGTTCGCGGCGCTCAGTGGCGCGAGATGA
GGCGATGGGGCGCAAAAGATGCCACACTATCCCTGCGGAGCTCCGCTCCAGGCCAGGGCCCTGGTTCTGTGCAAGATTC
60 TCGTGGGTGTGACAAAAGGCTGCCCCAGGCTCCGTGGGTGGGGGCGAGGCCAAGAGGCACATCCACACTGGGCCACCTGTCC
ACGGTAGGCGCATGACTGCCCTGAGGAGGGGAGGCGGCATTCGCCGCCACAAACAGGACGTAATTGGTGGCAGGGCTCTGTGT
GAAAGAGCCAGTCTGCTGTTGTCTAGGAGTCACTACAGAGGCCCGGAGACGCCCACTACTGAGCTGGAGCGGATGAGCC
CAGTATCTGGCAGTGACAGAGGGAGTTTGTGACAGACCAAAAGGCTGATGGGTGCCCTAGATTGGTGTCCCTCTTGAAGTGG
GCCAGATGTGGGACAGTCCCGAGAGCCCGAGGTGAGGGCACTGGTGCCTCTTGGGAAAGTGTCTCCCTCTGGGGCCCGG
65 TCTCCCGCCAGTCTCCAGGGGTGTCCTAGGTGACTGGTGTAGGAACCCACACCTCTTCTACTTGGGAAGTCACTGGAA
TTGTTGGGCTACATCAGAGCGCCAGAAAAGTGTGTTTGTGATCGGCCAGAAATAGGAGAGTTGTGAGTAGAGGGCCCGGGTGGAG
TTGGGGTGTACTTGGTCTGTGCTCTGAAGGTCACTGTGACAGTATGTTCCATGGTAAGGGGATGGGTGTGGAAGAGCTCTT
CCTTCCCGAGTGAGCCAAGCGGGCTCTCTGGCGCCAGGGCTGAGCGCAGCCACACAGCGCCCTGAAGGTGCGGCCA
GGGCTTACCCCTCAAGGACACGGAATGGCTTATCAGTACCTGACGCCCGTGGCTGGCCGGGTGGAGGCTAGGCTTACG
70 CATGCGATGTCCCTTCAGAAATGACTTGTGTCAATCCCTGTGCTGGGGGGTGGCAGGTAAGTGGGTGAGGGTTAGGGTCATA
GAAGCGACATCTACGTCCTCATATTTGCGTCATTAATTTGTTTGTGAATACGTGATAACATTCAAGGGCTCAAGATGCT
AAAAGGATGAAGGAGTGTGTCCTCATACCTGTCTGTGCTTCCCGTGGCTTCTCTTCTTCTTCTTCTTCTTCTTCTTCTTCT
AGTGGGCTGACGTTCCAGGAGGGTCCGTGGGCCAGGCTTGTCTCTCGAGTGGCCAGGGATGGCTGGAGGCTGAGGAGGGCTG
GATGTGAGCCTCAGATACCAAGTGTCTCCCTTCAGGCGGGGCGCTTGTCTCAGAGCCAGCACAGGGATGCCGGATCACGGG
75 GCGCTGAGAGGGTCCCTGCTCACAGCCT

GTGGCAGCGGGGAGCGTGGTGGCCGAGTGCAAGCCCTGAACCTGAGGAGCCCCAACAACTTCTGTCTACTACCGCCTCACAGC
CTTCTCTCCAGAGTGATCAAGTGTGACCCAGTAAAGTGAAGGTGATGTCCCAGGCAGCCTTGCCGGGGCTTACAGGGGGAGACACC
TAGTGCCACGGAAATGCCAGGCTGGTGCCAAGGCCCCCAAGGGTGACAAGGTGGGGCTGGGGCTGGGGCCCTCGGACCCAGGC
CACAGACTGACAGGGACCGGCTTCTCCACTGCTCCTAGAACTTACTGACTGGCTGGGAGGCTCTCACAGCCTTCTCACGTCCCC
5 TGGGGCTTCCAGGAGCCGTAGAGTTTCTGGGCGAAGCGTCCGGGACGAGGCCCCAGGCGGCCCCAGCCAATGGTCTGTGTGGTGA
TGGTGTGTGGGGTTAGGCCAGGCGAGCTTTGTTTGGGCCACAATGTGCGTGCCCAATAAATAGATGCTTGAAAGGGCTCTGTGT
AGGTCCGAGACACCGGACACCGGCGGATAGAGACAGCCTTGTGTTTACGGCCTCTTTGAGAGGCTGCTGCTGTTAAACCTGGG
ATGACTGTGTCTTTCTTTAAAAATGCCATTGTTTTATCCCGAGTCTTTCTTAAAGAAAGAAATAAAAAGACAATCAAAAGGG
10 TTTGTGGCATTACCAAAATAGACCAGAGAGGTGGCCGGGTGAGCCGCGGCCCGCGGTGTGTGAGGGAGTGACCGCCTGACCCC
AGCTTGGGGCTGGGTGGGCTGCAAGACCCGCTTTTGGCTCTGGCTGGGCCGCTCTTGGTGGTCTGCCCTCGAGCCTCCCGGGGA
CTCCGACAGGGTCTCAGCAGATGCTATCTAGGGTCCACCTGCCTGTCCCTGCTAGTGGTGCCTCTGTCCCGGGGACACTGGGAG
TAGCGGCTGCCAGCCATGTGTCTCTGGAAGAGGAAGAAGCTTTTGGCGTGGGACACCGAAGTTGGCAGGGGCTCCCTTCT
GTGTCTCGGCCATGGCCTCCCTTGACCCCTGTTATCTTTGGGGTGGTGAAGTGTCTCACCCGCTGTAGGGTGGAG
15 GCCAGCAGCCCGCAGCTCTCTCAGGAAAATGGCTCAGAAACACCATCGAGGCCCTCCAGAAGCCAGCAAGAGAAAGCCCTCCAT
CAAAATGAAACTCGCTCTGCACTTTTCAATTGCAACTCCAGCCCTGAGTGAAACCGCTTCCCGCCAGGGGTGACTGCCCTGG
GATGTGTGTCTTCCGGCAGTTGTGGGAAGTTGGGCGCTGGCCCTTATTGAGTAGAGACCATCTTAAGTATGAGGACAC
GTCTCACAGCTGACACAGACACAGGGGTGAAGTTACCGAGGGGAGTCCACTGTGCTGATCAGTGTGACCAACGTGAGC
20 CCAGACTCAGAAAACCGTCCACAGCAGAGGCCCTGCATTTCTAGGGCGTGTCTAGAAATTTCTTGTGGGTGGAAATGTCCA
TCTGTGCAATCGGGTGGCAGTGCCACACACCACTGACTTTTCCGGAGGAGCGTGTGCTGCTTTTGGAGCTTCTGGCTGTGGGA
GAAACGCTTTGTCCACCGGGTAGCCTTGACGGCAGCTGTGGGGCCAGAGGAATGAAGGAAGTCTGGAGTCTAGCTGATGTGT
25 GACCCCTGGAGTGGGTGATGGGCGAGGACGGGCCGAGGTGAAGAATCCCTGGATGGAGTGCAGGCGCCCTGGGGCTGAGAATTG
AAGCTGGCTGGTGTTTTAGGTTGAACGTGAGGAGTCTGTATCTCACCCAGGCTCTGGCTCAGTTTCCCCATCTGTACAGTGG
GACTGTTTGTGTCAGCCAGCCCGGCGAGCTTCTTGGCATGATGAGAATTTATCTGAGGGGCGGGAGAGGAAGCCCTCCCTATAA
AGGTACAGGCGCTAAATGTGATGACCTCAGTGGTCCACCTAAAAGTGTCTTGGCTGGGTGATGCTGCTGTGCTATGCTTTT
30 GTCCAGCCCTCTGTTTGGGAGTTAAGTGGCAGCTGTGGCGCAGTGGTGGGGCTGTGGCCAGCCCTGCTCTTGTGGGAAGGTC
TGTTTCTGGCTGCTGCTAGAGACTTGGCTTGAAGCCCTAGCGGCTTCTGGCAGTTGGGACACACAGAGCCCTCAACGATGAG
CCGGTTCTCCATCCAGAAGCCCCGGGCGAGTAAGCAGCCACTTCAGGCTGCGTGGGACTTGGCCGTGGTGGAGCCTAGGAGAGGCC
CCTGGCTGGGCGTGGCGTTCCAGATTTACGGCTGCTCTTCCACTGACAGTGTGGTGTGGACGCTGCCAAGGGAGTCTGGAGCC
35 CCAGAGGGTGGAGGTGCGAGACTTCCAGGAGCGTCCGTGCACTCCACCCGAGGCGAGCACCTCAGTGGCCGCGAGTGGGTGATG
CATGCTGTGTCAGGCTGATGGCTGGCCCGGGGACAGGCCCTGAGCGGGAGAGGATGGAGGGGAGGGATCAATGTTCCAGGTCCCC
CTGGCCACCCAGCATTCTCTCAGTCTGACAGCGCCCAAGGCTTCCAGAGCCATTGATCATGGAAGGCCAGGTTACCTCAAGGG
CTGCCACATGGAGAGGTTAAGTCTGAAAAGGCTGAAAAGGCGAGGGTTAAAAGGGCTCTCTGTCCAGATCAGATGGCACTGAATTC
40 CAGGGGAGCTGACAGCCGAGTGGGAACAGGCGGTGAAGGCGCTGTTGGACATGGGGACGGGCGAGGGGTGTGACGGGTGGGGG
CAAGCATCTGGTGTCTTGTGGCTCCAGAGACCAGGTGGGAGGTGGAGGCGTTGGTCTCAGTGTCTGACAGGTGATGGCAGCTC
CCACATCTCGCTCAGGTTAGAGGAGGCGAGCATGGGCCGAGGACAGTTTTGGCTTAGTCTTGTCTTATAAAGGCTTCCGGGT
TAGGCACTTGGGAAGGGCCCTCGCTGACGGCCCTTCTAAGGACCCCTCTTCCACCTCTCCCACTCTCCCACTCTCTCCGAGCAT
45 GCCTCCGGGCTGCCAGGAGCAGATCGAAGCCCTGCTGGAGTCAAGCCTGCGCCAGGCCCAGCAGAACATGAGCCCAAGGCGCGC
GAGGAGGAGGAAGAGGAGGAGGAGGAGGTGGACCTGGCTTGACACCCACCGAGCTGCGGGACGTGGACATCTGAGGGCGCCAGGC
AGGCGGGCGCCACCGCCACCCGACGCGAGGGCGGAGCGCGGCCAGGTGCTCCACTGACAGTCCCTCTCTCCGGAGCATTTTGAT
ACCAGAAGGGAAAGCTTCACTCTCTTGTGTGGTGTGTTTTCTTGTCTCTTCCCCCTTCCATCTCTGACTTAAGCAAAAGA
50 AAAAGATTACCAAAAATCTGCTTTAAAGAGAGAGAGAGAAAAAAATAGTATTGTCATAACCCCTGAGCGGTGGGGAGGAGG
GTGTGTCTACAGATAGAGGATTTATACCCCAATAATCACTCGTTTTATATTAAATGTAAGTGTCTTCTGTTTGAAGAATA
GGCATTAAACCAAAAGGAGGCGTCTCGGGAGAGGATTAGGTCCATCTTTACGTGTTTAAAAAAAAGCATAAAACATTTTAAAAA
CATAGAAAAATTAGCAAAACATTTTAAAGTAGAAGGGGTTTTAGGTAGAAAAACATATTCTGTGTCTTTCTGATAAAGCAC
45 AGCTGTAGTGGGTTCTAGGCACTCTGTGACTTGTGCTCATATGATGATGACTTATAAGTCAATGTTTATTATATTAT
CGTAGGTAGATGTGAACCTCTTACCTTATTATGGCTGAAGTCACTCTTGGTTACAGTAGCGTAGCGTGGCGGTGTGCATGT
CCTTTGCGCTGTGACCAACCCCAACAAACCATCCAGTGACAAACCATCCAGTGGAGGTTTGTGGGACCCAGCCAGCGTAGCA
GGGTGGGAAAGGCCACTGTCCACTCTACGATACGCTATATAAGAGAAGACGAAATAGTGACATAATATATTCTATTTTA
50 TTTCTTCTTATTTTTGTAGTACCTGTTTATGAGATGCTGGTTTTCTACCAACGGCCCTGACGCCAGCTCAGTCCAGGTTCAA
CCACAGCTACTTGGTTGTGTTCTTCTCATATTCTAAACCATTCATTTCCAAGCACTTTCAGTCCAATAGGTGTAGGAAATA
CGCTGTTTTGTTGTGTGTGTCAGGGAGGCGAGTTTTCTAATGGAATGGTTGGGAATATCCATGTACTTGTGTCAGCAGGACT
55 TTGAGGCAAGTGTGGGCGCACTGTGTGGCAGTGGAGGTGGGCTGTTGGGAGGCTGCGTGCCAGTCAAGAAAGAAAGGTTGTCAT
TCTCACATTGCCAGGATGATAAGTTCCTTTCTTTCTTTAAAGAAGTTGAAGTTAGGAATCTTTGGTGCAACTGGTGTGTA
AAGTAGGAGCCTCAGAGGTTTACCTAGAGAACAGGTGGTTTTAAGGGTTATCTTAGATGTTTACACCGGAAGGTTTTAAACAC
60 TAAAATATATAATTTATAGTTAAGGCTAAAAAGTATATTTATTGACAGGATGTTTATAAGGCCAGTATGTTTATAAATGCAATC
TCCCCTTGATTTAAACACACAGATACACACACACACACACACACACAACTTCTGCTTTGATGTTACAGATTTAATACAG
TTTATTTTAAAGATAGATCTTTATAGGTGAGAAAAAAACAACTGGAAGAAAAAACACACAAAGACATTTGATTCAGCCTGT
TTGGCGTTTTCCAGAGTCACTGATTGGACAGGCTGGGTGCAAGGAAATTAGGGTACTCAACCTAAGTTCCGTTCCGATGAATT
65 CTTATCCCTGCCCTTCTTTAAAAAATAGTGACAAAATAGACAATTTGCACATCTGGCTATGTAATCTTGTAAATTTTAT
TTAGGAAGTGTGTAAGGAGGTTGGCAAGAGTGTGGAGGCTGACGTGTGAGGGAGGACAGGCGGGAGGAGGTGTGAGGAGGAGGCTC
CCGAGGGGAAGGGCGGTGCCACACCGGGGACAGCCCGCGAGCTCCATTTCTTATTGCGCTGTACCGTTGACTTCCAGGACCGG
TTTGGAAATATTACATCGCTTCTGTGTATCTTTTACATTGTTGCTGCTATTGGAGGATCAGTTTTTGTGTTTACAATGTCAT
70 ATACTGCCATGACTAGTTTATGTTTTCTTTAGAACATTTGATTAACAGATGCCTTTTGTAGTTTTTTTTTTTTTATGTGATC
AATTTGACTTAATGTGATTACTGCTTATTCCAAAAAGGTGCTGTTTCAATAACCTCATGCTTCACTTATGCTTGGTGGAGCC
AGCGGGAGGTTTCTGCTGCTTGGCGGGCAGACAGCGGGCGCATCCACACAGGCTGGCGGGGCGGGCCCGAGGCGCGGTG
CGTGAGAACCGCGCGGTGTCCCGAGAGACAGGCTGTGTCCCTCTTCTTCCCTGCGCTGTGATGCTGGGCACTTCTATGAT
CGGGGGGTAGCATAGTAGTTTTTACAGCTGTGTTATTCTTGGGTGATGATGGAAGTTGCATAATTATTATTATTATTAT
75 TATAAAGTGTGTCTTACGTGCCACACCGGCTTGTACTGTAGGACTCTATTCCGGATGATTGGAATGTTGGAATTTGT
TCAAGTTTGGGTATGTTAATCTGTATGTACTAGTGTCTGTTTGTATTGTTTGTAAATTACACCAATATGCTAATTTAAAG
AGACTCCAAATCTCAATGAAGCCAGCTCAGTGTGTGTGCCCGGTACCTAGCAAGCTGCCGAACCAAAAGAAATTTGCACCC
GCTGCGGGCAGCTGGTTGGGGCCTGCCCTGGCAGGCTCCTGTGCTCGGAGGCCATCTCGGGACACGGCCACCCCGCC
ACCCCTCCAGAACAGGCTCAGCTTACCTAACCATCTGGCTGCGGCTGTGTGAACACGCGGGGGCTTGGGAGCGCTT
TGTCTGTGATGGGGCAAGGCAAGTCTGGATGTTGTGTGTATCGAGAGGCCAAAGGCTGGTGGCAAGTGCACGGGGCATA
GCGGAGTCTGTCTGTGACGCGCAAGTCTGAGGCTGCGGGCGGGCGGCTGGGTCTGTGCAATTTCTGGTGCACCGCGGCTT
CCAGCACCAATGTAACCGCATGTTTCCAGCAGAAGCAAAAGACAAACATGAAAGTCTAGAAATAAACTGGTAAACCCC

AGCGTGGTGCCTGCCTCTTTGCTTCTGGGCTGGCGGTGAGCCAGGGACGCGTGTCTGGTGGCCCTAGAACCAGGGCAGGGTGGCA
 GGCTTGGCGGATGTGGGAGGCCGAGCCTGTCTGTGCGCTGTGGGAAGTTGACGAGCATCTGACCTCCATCCCCGGGATGACAG
 TCAGGCCACCCGCGTGACAAACAGAAATGTCTCTGACACTGCCACATCCCCGGGGGTGGGGACAGAATCCAGCCAGGAGCAGGC
 ACACCCCTCCCACTGGGAGGAAGCCCTCAGCACAGGTGTGTGAGGTGGGAGGCGGTGTCTGTCTCCCGGAGGCTCCAGAGAATA
 5 ATTTGACAGGCTGCCTGGCTGGGTGAGCCACCTCCAACCACGCGAGACAACAGCTCCGCGCTGGGTGACGTGAGCGGTGCCATTG
 ATGGGGAACATCTTCCCTCTTCTTGGCCCCACAGTTTGTCTTCCCGGTTATTTGACAGATAGGAAATAAATAAAGCCGGCAT
 TCGTTAAACCTCTTCTGGCGAACTGCTGTTTGTCTCGATGAATCATGGTCTTTGGCGACGCCAGGCTCCGGAGGCTCCAGAAAGC
 ACCGTGTGAGGGCCATGATCCGGGGTGGCTTTCTCTGGGATCGTGGGGACCTGGAGGCCGCTTATAGGACACCCATGACGCCCA
 10 CCTCTGGATTTCAGGTGACGTGACTGGACTTAACCTCAAACCCAGGGTGGAGGCAGGTAGTGGGAGTGCCCTGGGAAGGTGTCC
 TGGACCTTGGTCACTGCTCTGAACCATCTGTGAGGCTGGTTTGTCTCATCCCAAGCTAAGTGGAAAGCTCAGGTCCCAAGCA
 CCGATGGGTGCTACTTGTGAGCTGCAGGTGGAATCTCCGTGGCCTTATGAAGCACCTGCTGTCTACCTTCTGCTTGTAGAGC
 ACTCTCCAGGGCTCAACAGTGGGGCCGGGGTGGTGGTGTGTGGCTCCACAGGCGCCTGCCCTGGGAGGAAGGTGGGGTGTGG
 AGGGAACGCTTGGCCCTGTAGGTCTCCACCAGCCTCTCCCTGAGGGTGGGGCTCCGGGAGCCTTCTCGAGGGAGTCTCTATA
 15 TTGAGTGGGTGGGGAGCCTGCAAGGTGCCCTGACAGGTGCATCAGAAAGAGCTCAAGGGACAGTCCGAGGACAGGTTGACACT
 GGTGGCCACTCGGGTGGCTCACAAGGCCAGCTCCTCTTGTCTCTGGGCAAAATACTCTGAAGGCAGGGACAGGTCTGCACCAT
 TGGGGTCTCCAGTCCAGGCAATGGCCAGGTCTGTGTGAGGGTGGGGTCTAGGGAAGCCATGTCCCCACCCCGGCTGACAG
 CTGGGTTTACATTTCATCCCCGAGAGCACATGGGTGTAGCAGGAGGCTGTGACAGAGAGCTCCGACCATCGCACAGGGCAGCTTTG
 GTTGTTCACGGAGCAGGCAAGGGAGCCATCGGATCTGTAGGTGTGAGCAAGGATGTGGGAAGAAGCTGGAGAGCCACTTTGC
 CATGCAGGGAGAGGAGACATGGGTCTAGGGATCTACTTTAGTGTGTGGAAGGTTTATAAGATGAAAGAGGATGTGTAGGCTGA
 20 TAGGTCTGGCAGAGCAAAAGGCAGGCATGTCTACTGGGAGAGATGGAGCTGAGCGCGGGCTCAGGAGGCTGGCAGGGCAGG
 GCCGGGGCCCTGGTGGGTGAGTGGGTTCACAGCCAAGTGTGTAGAGAGGGCTTGGGCCAGAGTGAAGCAGTGTGAAGCTCTCC
 CACAACCATCTCTCTGTCTCGGCATCTGTGGCATCCCGTGTGGTGGGTCTGTACACCCACCCCTGGCTGTGCCACAATG
 GGGGTGTCTGACACCCCTCACCCCTGGCTGTGCCAGATGGGGGGTCTGTACACCCCATCCCTGGCTGTGCCAGATGGGGG
 25 GTTCTGTACATCCCCAGTGATGGGTGGGTCTATACATCGTGTATATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCT
 GCTAACAAAGACATACCGAGACTGGGTAATTTATAAAGAAAAAGAGGTTTAAATAGACTCAGATTCTAGTGTGGGAGGCTC
 ACCATCAGCGGGAGGGGAAAGGCCCGCTTCCATGGCAGCAGGCAAGAGAGAATGAGACTCAAGTGAAGGGGAAACCCCTATA
 AAACCATCAGATCTGTGAGACTTGTTCACCACTATGGGAACAGTATAGGGGAAACTGCCCATGATTAATCACTCTCCACGGG
 TCCCTCCCAACACAGTGGGAATTTAGGGAGCTACAATCAAGATGAGATTGGGTGGGGACACAGCCAAACCATATCAAAGGCAT
 CGTCTGGCACTCTAGGCCCTTGTTCCTCAACTCTCAACTCCACTGACATCACTCTGTGCTGCAACCCCTCCTGGGATTCACTG
 30 GAGACCTCGTCCCTTGTGGAGTATCTGCGCTACCCAGAGGTGATGGTAAAACTGACCTTTGAGGAATCTCAGAGACAAGCCT
 TCCGAGTCACTCTCCCTGACGCCCTTCCGAGAAGCCTGTCTCACAAGCCGCCACCCCTACCTGCTGCTCTCTGGCCAT
 CTCCTGAGCCAGCAGTCTCTCATCTTCTCATCTCTGCCCCAACCCCGAGCCTTCTATCTCCCTTCAGCTCCGTCCAG
 GTCCCTGGGACTCAGCCCATCTCTCCCGAGCCTTGACCCCAATAAGCTCGATGTCTTTGCCCAGGAGCTCTGACACACAGACT
 GCATCCAGCTTCTGTCTGCTGCTGGCCACCCGCTCGGTCCACAGGAACCTTCATCTGTCTGCTGCTGCTGCTGCTGCTGCTGCT
 35 TGAGGGCTTCCCCACCCACAGCAGGCGAGGTGGTCTGGGAGTCTGGGATTGTGATGCTGGGCACCTTCTGCTCTGGCTGAGCC
 CCTCCAGGACGGAAATCTCCAGATTCTCTCTGCTCTCCCTCGCTCTCCACCCCTGGCATAACAGTGGGTCTTAGGAAGGGGCGAATG
 GAAGGGAGGTGCTGTGCTCTACAGGGCAGCCCAAGCTGCTGGGTGAGGTGACAGGCCATGGGTCCAGCTGACCCGATGC
 CGGAGCTGATTTCATGCTGGAAGGGTGGGGGTTCCCGAGGAGCCAGACAGCCTAGAGTTGTGCAAGGAGTGAAGGGCC
 TGAGGGGACAGAGGAAGGAGGCTGGCAGAGTGGGCACGTGGACTTCGGACCGCGCTTGTGGGATAACAGTGGCTAGGCTTGTGA
 40 GAGGTTGTGCACTGCCATGGGAGTCCAGAGAAGCCAGGTCCAGTGGCAGTGGCATGCATCCGGCAATCCCTCCGGTACCTCTGC
 ATGCAGCGTGACCTCTCTGAAGCACCCAGGAAGCAGTCAACAGCTCGCTCTGCCCAGCAATTGGGGGCTGGCTCTGAATCTGG
 TGGGAAGGCTGTGTTGCTGCTGGCACCCGCTCTATCACCAGTCCCAACATAAGGCTAGTCCCAAGTCAAGCTCAGCAGCAGG
 GCCACGAGGGCCAGCAAGGGCAGGCTGTGCGAGGGCTGACGCGTGGGTGTGCGTCCCGCACTTGGGCCAGCCTCGCAGCTCA
 CAGGGCTGTGCTATCCAGGAATGTCTTTGATCAAGAGTTTATGCAAGACGAGGAAGCAAGCCAGGACCTCTAATCCGTTCCTCA
 45 CAGTCCCTGCCCCGAGGGCCCCACAAGCCAGCGCCACCCGAGGCTGAGCAGACAATAGCAGGCGGACGGGTGGGCGGGC
 AGCTTCTGGGGCCGCTGGCCCTTGGGGCCACATCCGGGAGCATTGTCAACCGCACTCAGAGGGCACACAGGAGGCTGGGGAAGA
 GAGAATGCAGAGCCCTCTGCTGAAGGGCTTCCGTGGGCTTGGAGCCTTCAAAGACGGCGGTGTCCATTATCTTTAATTGTC
 ACCTAGCGGAGCTGAGACAAGCCTCTCAACCGGAGCCACTTTAAGAGCTGAGTGGTCTAACCAGGAGTACAGCTCTATTCCAG
 ACCCTGGGCCCTCTGAGCCTGTGAGGCGAGTCTCTTGTCTTGTGTTAATCAGGGAGGAATCGAGCTGGGCTTACAGGCTTGA
 50 GCATGTGTGCTTGTGCTCAACACCGAACAAGTTTCTCTGAGTTTGTCAACGACCCCATGGGTGGTGACAGGAGGGGACA
 CTCTGGTGGCAGCCACAGACAGCCCTGCCCTCCAGAGCTTCACTCTCCCGCACACAATCATCCCATCTGCTAGGTGAGGAT
 TGGCAGGTTTCTGGAAGGGCCACAGAGAGGCTCAGGCTTCTGTTGGGCCACAGGTTCTCTGCTGTGCAAAAGCAGCTTGA
 GCCGCTCTGTGAATGAGTGAAGTGGCTGTGTGCCAATAAAGCTTTATTACAAAATAGGCAGCAGACTGGATTGAGGTGAGGG
 55 TGGTAGTTTGGCGACCCCTGTTGTAGATGAGTAAACCGAGGCCAGAGAGGTAAAGTAACTGAGCCAGGACTGCACAGCTAGTGTG
 TGACCAAGCCAGCCTGGTGGTCAAGCTCATGGAGAAGAAAGGCTCAAGCTTCAAAAAGGGAAATGCACGGAGGCTTCAATTGGGC
 CATTGACGCCAGGCCCCACGCACACAGCTCAGGGCCCTGCTTCCGACGCTCCACCTGTTTTCAGGCTCCAGTGGTGGCCCTG
 CGGGCGGCACTGTGCTTGGCTGCTGGCTGGGAGAAGGGCAGCCAAACAGGCGGCGAGTGGACATCTGAGGTTGACAGCTGTTTA
 AAAAGAAAACCTACCGGCATGTATAGGCACACATTAAGCACACAGTTTGGAGTAAAAGGCCCTGGGGTTGATCTCGGATCTGC
 60 AGCTTTCCAGCTGTGCGGCCCTCATTCTCTGGGCTCAATGTTCACACCTATAACATGGGGAATCTGCAAGAACACAGCCCATG
 ATGGGGAGTCTGCTCTCATCTCTACTCAGCAACGACCCAGCAGACAGAAGCGGGGCTCCATAAATCTCTGTCAATAACTGAATCTT
 TCTGGGGTGTGAGGATTCTATGGCTCAATGTGTGTAAGCACTGCTGAGCACCAGGCTTGGGGTGCAGTGATCACTCAGGGAACG
 CCATCATCCCTCGGCGCATCCGCATAATCACCATCAGCATTTCATGCACTGCCAGGTCTGGAAGCACAGGCTCCATGCCACGG
 CGGCCGCTGGGTGGTGGCACCAGCCGATCTTACTTCCCTCTTTGGCATTAAAGTAGACAGTTCTGGGTCTTCTTGACACCA
 65 CCGATGCCCTCCTGGTGTGACAGCACCAGACTTTGCTCCAGGGAACCACTTCCAGATCTGTGGTTTGTAGTGGGACCGAA
 CCGATCCCGAGCTCAGGCCAGGTCTTATAGGCTGAAACCACTGACATCCACACCCACAGAACAGGAGCAGCAAGTAAATGGAT
 GGGTGAAGAAATCAATAGAGCCATTGAGTCTTGGAGAGACATTTCTGGAGCTTCTGAAAAGATAATGCTTCCCTTCTCTTAGG
 ATTCCAGCAGGGAACACAAAGCCAGGGGTGGCACTGCCCTTGCAGCCCTAAGGGAAGACTGAGCTGCTCCAGGACCTCACA
 GGGGAGGCTGAGCGTAAGGCCAGCCTGAGGGAAGCAGGGAATGGGTCTCAGACAAACTGCTGGATCAAGCTCTCTCTGAAGTC
 70 ATCCCCCTTTTGTTCAGAAAGCAATCATTGTCTTATTAGTCAAGTGTGATATGGGCACTGTGTCATTGGTTTCAAAGACAC
 TTAATCTATTACAGCTTGTGTGTTTCTTTTCTTTTGGAGAGGAGTCTCACTCTCGCCAGGCTGGAGTGCAGTGGCTGTGCT
 CTCGGCTCACTGCAAGCTCTGCTCCCGATTACGCCATTCTCTGCTCAGCTCTCGAGTAGCTGGGACTCAGGCGCCGCT
 ACCACCGCAGCTAAATTAATTGATTAGTAGAGACCGGTTTACCGTGTAGGCAAGGATGGTCTCGATCTCTGACCTCGTGA
 TCCACCGCCTCGGCGTCCAAAGTGTAGGATTACAGCGGTGAGCCACCGCACCCGCGGCTGTGTGTGTTTCTACCTCTTCT
 75 AGATCTAACATGTTATGATTGATATAAACACAGGAGCGACTGACAAAGTTACCATGTGATCTTGAATTTCAACATGCTGTCTG
 GCTTAGCTGGGAGTTCCACAGGCTCAGGGAATGACTCTCTTGGGGCCACAGTGGCCAGAAGTATGCTAGAACTGCTGTCTG

255

257

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75

TTAGCTGCAGCTGCTTCCGATGTGATAATGATGCCGGTCCCTGGCCCTCCCACTCAGACCAAGGGCTTTATAACCTGTGGGGA
GCTGCTGCTACTCCTGTGGTTTGGGAAGTGGCTCCTTGGGGCTCTTGTGGGAACCTGGGCTGGGCTCCTCCAGGCGGGGCAAAA
AAAAAAAAAAAAAAAAAAAAAAAAATCGGTGGGTTCTGCCCTGCCCGAGGAGTCTAGGGAGGAGGTGGATCTGCTTGGATCTGT
GAAGGAGCTTGAACGTATCTCCACAGGGTCTGGGGAGAGGGTGGGTGAGCTGGCACCTCCCTCCACCTGTTCTGTGGCTGG
CCAAAGCTTCTCTGACCTGAGAGGAGTCTCTGGGCCCCATCTCTAGGGAGGAGGGCAGCAGGCAGACTCTCTGTGATTGGCTGGC
TGGGAAGCTAGGGTACTGGGGCCCCTGACTGCTGTGAGTCGGGGAACCTGGATTCTCTCTGTCAAGCAGCTCTCAGGATGGGA
GGCCTGAGTTGGGAATCCGGGAGGCCCCACAGCTCTTTGTGATGAATCTAGTTTCCAGAGCCAGGAGCACGATGTTTGGAGGA
TTGAGGCTGGGAGGTAGGAGACTTACTCTTTGTGAAGAGATTAAAGGTGGTCTACATGGCTGTGTGAGGGGAGTTTTCAGAAAT
AGGCAAGCCCTCCTTCTCTGCTCGAGGCCCTGAGCTGAGAGTGGCCTGCGGTGAGAGTTGTGAGGGACTCCAAGAACTCCAGCA
GTCTAAATCCACAGCAGAGCAGAGGCCCCAGAAAGGAGGGGAAAAATCCGACCAGAGCGCTTGAAGGCAGGGATGGGTGTGCTG
TGCCAGCTCCTCTGATCTTGGGGTAGGGCTGGGGTTTTCATGTCATCTGGATACAGGGGAGCGTGGCCACCTAGTGAGGACTCCC
ACACTCCTGGTTGCCATTGGGGTGGCCCTTTAGAGGCTGGATGCTATTGGTTATTAGGATAGAGCCAGGGTCAAGCTTCAAGC
TTCTTGCCCTTACTCTGGCTCTAGTCCAGGCTGTTTCTGTGGGGTTCTGTAAGAAGCCTGGGGTGACACCTAGGTCATGGGACA
AAGAAGAGGGGACAGTGTCACTGGGGGGGTCTGGAAGATACTGGGTGGGGCTGACATTTCTACCTCAGTGAGGAGTCAAAACCAT
GAGTTCCTTCTGAGATAAAACAATGAAGAAATCTCTGTGTGCAACTCGGAAGTGCAGCTCGGGCCAGGGCTAGGAATTCATA
TGAGTAGACTGAGGTTGGGGCTCCTAGCCTCCTCTAAGACCTCTGAATGGTTATGTAGGCTTGGACAGGTTTCTCAGGGGTCTC
TGGATTCTCTGTTTGGCTTGGATGCCCTCTGGAGACAGGACCACCCGTGATGTCCACAAGAGGGGGTGTGGGTTGGGTT
GGGCAACCTCCTCTTTTGGGAACCTTAGGAGTGGCTCATGCTCATTTTGTTTAAGAGACCTGGATGCGATGTTGGGGAAGAAGAG
ATTTCCGAAGCCTGTGGAATTTAGAGTTGGTCTGTTTCACTCAGCCCGCCTCAGACTCAGTGGGAGGATTAGAGGGGATTAATTC
AGGTCGTTCTAGCACCTAGTAACCATCAATAGATGCTTAAGTGTACGGCCCTAGTCTTCCCTGCCCCAACCCGTACCCCGG
CAGCAGCCCCCTGAAGCCAGAGGCAGAACTGTGACCCCTTCTGTCAAAATCTCGGGCCCCCTCGGCGGACTGCTGACTCCATGTTCTT
CCCTAACCCCGAGGAGTGGGAGGTGCTGGTCTGGGAAGCTCAAGTGGGACCTGGCTGCCGTGATTGCGCAGCACTCTCTGGCCT
TGATTCTGCACCGCTGTCTCTGCCAGTGACCGGAGGCTTGGTCAAAAAGCATGCCAGACCTTTTGGCCCTCTGTGCTACA
GGTAAGAGCCCAACTGGGGGAAATTTGGGGGTTTGGGAAGGATACGTAGTAACAGCCAGGAGATGGTTTCACTAGTCCAGACCT
GTGTACAGTATCTGGGAATCTGAATAAAGTTACTTGGCTAAGGTCTTATAGCAGGGTTTGGATATTTGTTGTTCTCTGGT
CCAGTACACCTTGGGTAGATGGAAGTTTGTGTTTGTCTCATCTCAGAGGAGGTGGGGCTGTGGTCTGGTGGGTGAGTATAG
GGGCACTTCTCAGTCTGAGATTGCAACACTGTGAGCACACCAACCAACCCCTCTCCCTAGGATCTACTTGTCCCTTGGC
TCAGTGTACCCCACTTCCACTGGGGTTCCAGGATGCAGCTGGTGTGTTGAAGATGGTCCCTTCTTTCCAGATTACA
CCTTTGCGATGATCTCCTCATCATGATCGCCACAGGCAGCATTTGGGGCAGCCGTGCTAGGCTTAGGCGCTGCTATGTCTGGC
GATGAGCTCAGAGAGTTGCTGGCCGGGATCACAGGCACTGAAGTGGTAAGTCTCAGCCCTCGCCCCCTTCACAAAATTAATAA
AAAAAAAAAAGCTGTTCTCTGAATCTCCAGCAGAGGGCACCATCCACCCGGGCCCAACTATGATTGTACGCCCTTGCTGCT
TTCTCTGGCCTTTTATCTCTGGCTCCAGTCTGGAGAGGAGTGGGTGGGGTGAAGGACACTTGGCATGTAGATACCTTCTCTT
ATCTCTTGACAGTGCTGTGCTCGGACAGGGGTGGGGGACTTGGTGTGATGGAGGGTGTGCTCTCACACCTTGGCACATCTCT
TTGCCAGTTTCTGAGAACTAAAGACCTGATTCTGGGTGGGTGTGGCTTAACCTCCCAGACTCCCAGTGCACAGGGGGTGGC
CTTTCCACTGCTGTCTGTGCTGCTGAGGAGAGAGAGAGGCCCAAGGATGAATGACCTTGTTTTTTTTTTTTCTAGGAC
CAAGCCCGCCCGGGCTCTAGCAGCCAGGGGCCAGTCCAGCCAGCACTCCACAGATGTACAGCCATTACCTGTAGCTTGA
CAGGCCCTCTCAGGCCACCAAGCAGAGGAGGGGCCCTGCCACCCCTCCCTGCTCTAGAACAAATCCATGCTATATCTGAAGCC
GAGGGGGCTCTCTTCCCTCCCAAAAGCCCAAGGGGCCAGGCTCTGCTATCCCACAGTGTGCACTAAGGGGTGCTAGTGTCA
TGAGGGGGCTCTTCTAGTGGCCAGTCACTCTCTCTTCCCTTCCCACTCAACAGCTTGGCTGTCTGGGGCAGTGGTCAAGAA
CAAAACAGGTAAATCCACACACAGCATTTCTTTTGTAGTCCCTCTTCTGTCCGGGCTCCAACCTTCTCAGTTGCCAAAACGCCCC
AGTACTTCCAAAGGTGTTGGCCCTTGCAGGCTCCTTGGGCATCCCGATAGAAGCTTATGAGGAGTGCCTAGATGGCCTCTGT
GTAATCCGTACTCTAGCTGCTCTTAGAGGGAACAGCTTAGGCTTGGCCAGAGCAAGAACCCATACACTGTGCTTGTCTGCTG
TTAGCTTCTGTGATTGTGGGTCTTAAGGGTGGCGGTGCTATTTAATTTATGTCTTGAATACAACCTGTAAGAGGGTACAGTGAG
GCCTGTACCCCAAGTGGTGGTAACCTGGCGGTGCTCTTCTCCCTCCCTCTTCCCTCTGCTACTGCTTTGTGGCCAGGAGC
TGCTACAGCTGGGATGGGGGTACGCTTCTCTCTCACCCTCCACCTCATCTTATCAGAGCAGGTTAGGTTGGGATGGAT
CGATGCCGTGGAGGTGACAGAGCTATCTGGAGAGAGGGCAAGCCCTAGGCTCACAGGCTTCTCTCGGGCCACAAGGTTGGGCTG
GTGGGCCATTTCTATCATGCTGCTTAATAAAGATTTGGAATAAAGGTGGCTCTTGTGATCCTGGGGTGTGGGAGCTGGGGG
CACCAGGCAGCTGTCTTAGGCAGAGCTTTCTTCTGGGAAGGTTAGAAAGGTGGCCCTAGGCAGCATGCTCTTCTTCTTGTG
GACGAATTACAGCGCTAAGGAGCAGCCAGCATTACCCAGAGGGCTCATCGGAGACAGGCTGGACCTTACACAGAACCCTAAGA
TTCATACGACATCAGGCATGGTCTTCTTAGCACACTCAGGGCAGACAGAGGAAGAGGGCTAGCCTGTGCTACATAGTGCAAGA
CTTGAGCTCAGGCAGCACTGGCTACTCTGAGAGCTGGACTCAATCCCAGCAGTTAACCATTTTAACTCCAGTCTCAGGGAT
TTGTGCTGAGGCACAAAGCTCAGAATGTATTAATAAACAACCAACCCGATGAATGGGGTTAGGGTGTGGCTGGAAGCACTTCCCCT
AGCAGGGAGGCAGGCCCTTCTCAGTGGTGTGCAAGGAGCAGCCCTGCATGGGAGAGGAGAGGAGGAAGAGGGAGGGAGGA
GGGAGGGAGAGCTTGAGTGAGCTCAGGGAGTAATTTGGTTGGGTGGGCTAGGTTTGTCTCTTGTCTTTCCCTAATGTTTACAA
GATGATCTACTGTGTAAGCAATATGAACCTCAACAGACCAACCTTCTCAGATATACAACTGGATTGTTATAGACACAGTTTTC
AAAAGTGAACGTGATACAGCAAGGTGACTTCAAGTCAGTCACTGTGATGCAATGGTCTAAGGGTTTGTGTTGTTTGGTGA
GGTAGTGTTCACAGCAGTGGCTGGCCTCAAACTTACAGATCCATGGTTGGCTGCTACTAAAATTTTACATACAGATTTTCTCAGGCC
ATTAATAATAACAAAGATTGTAAGCCTAGCCCTCAAAAAGTTGAACCATCAGGCAGGTGGGTGGCCAAAGTTCAAGGTCAAGCTGG
TCTACAGAGTGTGTTCCAGGACAGGCAGGGATACACAGGGAACCTGTCTTAAAAAACCAAAACCAAAACCAAAACCAAGCA
CAGTATTCTTGTCTATTAGTTATGACAGACAGGAACCTGACCTGGCGTCTCAGCCAGCCTAAGCTCTGGTTGCTGTGATGCTA
GGAAAGAAATCCCATTTTTTCTGATTCTGTTGTGTCAGTGTCCCTAGCAAGGGCCTGCAATATAGTCTTCCCTGACAGTGAACCA
CTGCCACTTTTCAACAGACACCTTTCAACATGGCAGCAGAACTGGCATCCCTAGAGTCGGCCCTGACTGTAGCTCATGTTAGG
AGTCAAGGGCGGTGTGATACATTTCTGTGAAGAACAAAGGAAGCAAGAGTCTAGAGACAACTTTGAAGAATAAGGTGGGGT
CAGGGGAGAGAGGCAGGACCTCCAGGACCAAAACACAAGAGCTGCGATAATAAATGCCTGTTTCTCCGACCCCGCAGGCT
TACACAGTATCTGGAGAGAGCAGACCTTATACCACTGCCAGGTGGGTGTGGGGTGGTGAACCCGAACTGAGGTAACTCCGGTTA
GCTTCCAGAGTGAGCAGGGACCAAGCCCTAAAATGGCAGAGAAAGCCAAACAGATGCACTCTCTCTGCCCAGGATTAGGCCAG
GCAGCCATAGTAGCCCTTCAAGTGTCTTGAACCTAGGTCTTAACTATACAGCTGGGGTCTGGGGTGGTCTGCGCCCCCTGGGCC
AACACAGGTGACTGTTCTCATTCCATGGTGACACCAACCTCCTCAGCTCTCTGGGGACAGCGCTCTGAAGCTCAGCCTGATCTC
AGGGGACAGCTGCGGGTGGGGCTGCAGCCGAAGCAGCTCCAGGAGGGCTCCTTCTGCTCTGTGGCCAGGTGAGCTTATAGCGT
CGCTAGTGTGACAGGCACTGGTGCAGAGGACAGGCAGCTGGCGCTTTTCCGTCCGGAAGGCCAGAAAGTGGAGAGCAGCG
TCGAGCACGCGGTAGGGCAATGCTACTTCTATCCAGCAGCAGGCGCAGGAAGATGCTGTTGGCACCGCTGTATTCCATTTCTGC
GATCTTCAGCATGGCGCACTGGAAGGGAAGGTGGAGTACAGGAATTAGGCCACACCTATGGGAGTCTCTTCTTACACTGAGCC
TTACTTCAGTGTTCACAAAGGGGCCACACAGGCTGCTCACCTGTTGATTACTATGCTCTGAGAGTTTCTACCATCTCCATCCAT

CTGCCCCACCCACACCTCTGCCTCTGGCTCGGAGAGCAAGCAATCCCTGTGTTAACTACAGATCATGTCCAAATGTCTCACGATC
CGCACATTTTAGCACACTTCTCTCTAGATGCCATTTACACACGCAGTCATTCAATTATACTAGCTACCAGGACCCCTGGCCCTG
CTCTTGAAGACCTACTATTCTGTTGGAGTAATCATACACCCACTGACATAAACCGGTAGACTCGAGGTAATCATAGCTCATTCTCC
ATTCGCACCTCAGACCAAGTTCCGGCTCTCTATCACACGGCTCCTCTCTGACCATCCTCCTCCACCTCCCCACCACTACCTGG
5 AGTGACGACGCGGGATGGAGCACTTGGTGATGATGCTGCCACGATGATGGCTTACGGAGGGTACAGGTGCCGGACTCACACAGT
GGGATCAGGATTCTTAGGAGAGTCAGATGCGATGGCTTTTAGACCGGGGTGAGGGAAATGAGGCGCAGCCCCAGCAGCCCCAGG
CATCAAGGACCCCAATGATCTGCCAAGTAAGAGCCCCACCCCTCCTTTCTCCCTGCTTCTGCTCTACCTTTGAACCAAGCTCC
AGGCTTGAACAGGGCTTCTTGAGCGCCATGTAGAGGTGAAAGTTGAGTCGTTTGTATTACAGCAATGTCTCTCGACTCGGGGAA
10 GCAGGACAGGTTGTAGAAGCGCTGAGCCATGCGCTCCTTCAAGTTAGAGGCAAAATCCTAGCAGGTTAGGAGTTTCAAGTTAC
CAGAGAGCTGACCTGGCCCTTAAAGATCATCGCGGATGGCTTACGAGAGGTTTATAGTCAGACACGGGACAGCGTGTCTT
TATAGTCAGAGCTGTAGCATGGAGTGAAGCTCTTCCCATGAAGAGTACCACAGGACTTGGTCATGAAAACTGGTGAGATGG
CTCAGTGGGTAGGAGCACCAGCTGCTCTTCTGAAGGTGAGGATCAAATCCCAGCAACCACATGGTGGCTCAACACCATCTGTA
ACAAGATCTGACGCCCTCTTCTGGAGTGTCTGAAGACAGCTACAGTGTACTTACATATAAAAAATAATAAATCTTAAAAA
15 AAAGAAAAACGAAAGAGCAGGGGGCTGGAGAGTGGCTCAGCGGTTAAGAGCAGCGCTGCTGTTCAGAGGCTTGGAGTCAATC
CCCAGCAACCACAGTGGCTCATAGACATCTATAATGAGATCTGATGTCTCTTCTGGCCCTAGGCATATATGTAGACAGAATA
CTGTATAGATAATAATAAATCCTAAATAATAATAATAATAATAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
ACTAAAGCCCAAAACCCATAAGACTGAAAGTGACTGAGTTCAGGCCAGCCTGGCTACAGAGTGAGTTCAGAGGCTTGGAGTCAATC
20 TACACAGAGAAACCTGTCTCAAAAAAACAACAATAACAACAACAACAACAACAACAACAACAACAACAACAACAACAACAACA
AAGGAGCAGCAGGAGCGAGTCCAAGGAGGCCATGGGCACTGAAACAGCTCTGGCAGGCAAGCCCGCACAGCCAC
AACCTGGCCCATCAATGATACCTGGTGGCTTGATACATGGCGGTGACGTCCAGGCCCTCAGGCTCAGTGACATAGAGGATCTGCTC
CCAGTTGGACAGTGACGGGATGACCTTAAAGCCTTGGGCAGTTTCCCACTGCGGTACTTACATAACACCTGGGTGAGAGAGCA
AAATCGCCAACTTCTGCTGGGTCTGGCCCTGTTGCTCACTCTCCAGAACCTCTAGAAAGCCTGTTCTCGGGTGACCGGA
25 GTTTAGTAGACTTCCAGGGTCAATAAGAGACAGTGCAAGAACCCTGAGCCTATCAGCTCTCCCCAATCCTGTTCTGATCGCCATGG
CTTATTGTTGGGGGCGATGGATGAGAGGCCACCCGAGTCAGGATATCCAGCACACACCACTTAGCTTTACCTCCGGACT
CCTCGGTAACCTTCCAGGACCCGGGATCCAGTCAGGCAATGGGAAGCCGATACCTCTGACATGACAGTCTCCACTCTGCTG
CTTCTCGCTCAACTTCTCCATGATGATCAGCCAGGTTGCGCTATGAGAGACCGGAAAAAGAGAGGTGGAAGAATTGGGGTC
ACTTTCCATGAACTGTAAAGTCCCTCAACCTGTTTTTATCTTTGTTGTTGTTATTGACACAGGGGTTTTATGTCTAGCTTTG
30 CTTGCTTAGAAGTGGCTCTGTAGACAAGGCTGACCTCAGACTCAGAGATCCACTTGTCTTCTGCTCCTTTGCTGCTGGGATTAATG
CTATGCTGGCTGCTTTTATTAATAAAGAAAGGAGTGGTGGTGAAGCTTTAATCCCAACACTTGGGAGGCAGCAGGATCT
TTGTGAGTTGAAAGGTGAGCATGGTCTTATAGGAGATCTAGGCCAGACAGCAAGCCCGTCTCAGAGGGGAAAAAGAAAGTCAC
AAAAGTCTCCCAAAACAAAAGAAATGCTTCAAACTTGATGTCTCTTGTGATGGGGCCACGTCCTGTCTACTGTTCTAATT
TTAGTACAGGGAAGCTGGAAGCGAGCAATGTATAATTTCCCTGGACGCTGACAAATCTCGATCCCGCTGGGATGCACAGCCTCAG
35 TTCCCTCTATGTCCATTTAGCCGCTCAAAGTGTGACAGACAGGGCCCTGGATGTCTCTGATCTGACGACAGGCAGAGTGG
TGGGAGCTTAGGCCCTTAGGCCCTGAAGTCAAGTCCGGCTCTTCTGGTCTTGTATGATCCTGGGCCGCTCACTTGACTCCTCTA
AGCTCAGTTCTCTCATCTGTAACCTGGGGAAGTAAAGGACCCCTCGACAGTCAGCTGAAGGGTAAATCTTAAGACTGACGA
GGCCCGACTCTCAGCCAGAGCCAGCAGGTCTGAGGGCTGTTTACTTCAAGCTCACCTCCCACTGCTCACACAACGGGAGCAACT
TCTGAGTGACAGTGAGGCTCTGTGCCAGGCGCTGGTGACACCTTTATCCCAAGCCTCAGAAGGCAGCGGCAGGCAGAGT
40 TTGTGAGTTCAAGGCCAGCCTATCCTACTCACCAGCACTGCTAGCAAGGATGAGACCTGGGTTCTGGCTTCCAGCAACAGGGG
AAAAAGTTTCTCTGACGTCTTTTCTGTGCCGAGCAGCACTGAATCTGACACTTCCAGACTTGTGCTCTGTGCTGTCATGACAC
TGGTGGCAGGTGCTTTTATTCCCGCACTGCCAGGCCGGGAATCGAGACTCAGGGCCAAACCAACTCTCTAAGCCCTAAG
ACTTTCTCAGGGAAGGTAATTTAGTCTTTCGACTTCTGAGTTCTGAGTTGGGTGCTTCGACGCTCTCAATGTGCTCTAGCTGACAAG
GCTGATTTGCTGTTTCCCAAGACCTTAGCCTGGTTTCTGAAGATGCCAGCAGCACTGCTCAAGAGTGCCACGGTCCCTCTT
45 TCCACCATGTTGCTACTTCCGTATAGCAACTGCAGAAACATTCTGCTAAGTTTGTGATCAAGAGCCACTGGGTATGAGGTGCT
CCCCGAGGCTTTGGGGGACATCACACCCATGACACTTCTCAGAGCTGTCAGACCTCTCAGGGACAGGTTCTCTGTG
TCTCTGAACCCAAAGCTGCTCATACCGTACTTAAATGATAGTGGTGTACTACACCCACTCTGAAGAATAAATGTTGAGCCCC
TTTGCCCTAAGCCAGTCTCTCAATGAGGCAGATCCATCTGAATGGAACCAAGAACTGACCAAGGCAGCCTAAATAACTGCA
TGTTTAGAAGTAGCATTTATAACACATGGGGTACGTTTGTGTTTACCCAGAGGTAGTTTAAACCTCTGGGAACATTTGTC
50 AGAGTAGCTGCTATTGGCCCCAACCTGTAACCTGAGATGGAACCCCTGAGTTAAAGACTAAGCTATGGGCTGGCAGTGGCTC
AGCAGTAAGAGCACTGACTGCTCTTCCGAAGATGCTGGGTTCAATCCAGCAGCCACATGGTGGCTCACACCCACCGTAATGA
GATTTGGTGCCCTCTTCTGGTGGCTGTAAGCCAGCTACAGTGTACTTATGTATAGTAAATAAATCTTTGGGCCAGAGCGAGTGGG
GTTGGCCAGATGAGTAGAAGTCTAAATTAATTTCCCAACCAACATATGATGGCTCAACCATTTGTACAGCTCAGGTGACT
CACATACATAAATAAATAATCTTAAAAAATAAAGACTAAGCTATGAGAGTAACGTACCAAGAAATAAACAATAAAGCGATC
55 CCCAGCTATCACAAGGAACCGTAATCCAGAGGTTCCAGATCAGATGGGCAAGGGGAATCCGGGTCACTCCCGTTCCAGGGGCCAC
CTTTGGCAATGGTCAGACCAACAGCTGTGGTCTGGATGAACCTTTTACCAGGACCCACTGGTCCAACCTTTAAGCCTTACCTCAG
GGAGGATTCTGTTTATGAACATTTCAATGGCAGCTCATCTTCCAGGTCACGATCACCTCTGCTGGTGGTCCACCCCGGCCAT
TTTGGCTGCCCTCTCCAGGGTAGGCCACTCTCTATCTCTCTCATCTGATCCATCTTGGCAATCCCGGCCCTACAAGATAATCCC
AGCCGAGGGGCTTGTGAGTCAGTTCCCAATCCAGTACAGCACACCCAGGAGCAGGAGGGACACCTGACAGGAGTACTTCTT
60 TTGTCCTCAGAGACTTGAATCTTGATAGAAAATACAGCACAGGAGGAGATGATAAGGCCAGTAAAGACTGGATGACATGTC
CCCTCAGTGAATGGATGACATGTCCCCCTCAATGACCAAGAGGATCCATTCTATACTACACATGTAACCTGGTCTGTCCAGA
TGACCTCAAGGAATAGTACTGTTGCTATACCCAGTTCAAACCGGGCAGAAGAGTTGATGTGCCACAGTAGGTAGGCACTGTGG
GTCTGACTTCCCATATGTTGCTTGACAGTGGAACTGCATCTGTGCTGAAACTAAAACCATGGTGGAGGCAGTGTGACCTCA
GGCACTTGGATGAGTACAGAGGCTGAGGAGCTCTGGATGGGCAGTCTGGGAGCAAGAGCATGTCTCCAGCTCTGGAAAGTAAATGC
75 GTTTAGAGTGTGGGCACTAAGGAGCCAGAAAGGAACGGAAGCAACCTGGAAGGCTCTAAGGCTGGGCAGTGGCATTGGACT
CTGATCAACCAACATTTAAGTTACTGGCTAGGTAGTCAGGAGTACTTGGGAGTCTTGTCTCGGCCCTCACTTTCCAAA
CACGACCAAGTGTGAAGGCTGAGCTTCTGATGTTGGGTTAATCCCGTGTGTTCCATGTAAAGGCTGCTGTGTACTATTACA
TGTTAATCTTTGTTCCAGCAGAGAGCTGAGTACAGTCGGCATTGGTTTTTTTTTAAATGAAGCATCACTGTCTCAGTGTGTGG
AACTTCTGTCATCACCTTCTGATGGTTTAAATCAAAAGCTGAGTGGCCATAGCAGGCTGGAAGGATCTGCTGACATCTCTG
GGCAGAGATAGGAACCTGGGAAAGAAATCAGATGTAGGGGACTCAACAGCCAGACACAGAGGAAGAAACAGTGTCTTACTGA
70 AGAGCAGTAACGAGCCCGTGGTGAATGTAGACTAGTATAAGCAATATGTTGTATCAGCGAGTTCCGAACAGGCAAGCTAAGG
CCAAGCTTTCATAACTAATAAGAGGTCTCTGTGCTCTCACTGGGTGATAGGTGGGTTGAGCCATTCTGCTGACATCTGAGGTCC
TGACCTGGAGTCTTGGCTGGGACTTCTCTGAGTGTGGGATTAAGTCATGTGCCAATACACCGGGCTGACTTTTGAATACCGC
ACATAGCTGGCAAGGCAGTTGGGAAAGAGTCTAATAAACCAAGTAGTTGAATATTACCATAGCAACAGATCAGTTGCTATGGAA
GTGGACTAAGGGTATATTATATAGAGCTCCAGAGAGTACACAGGATACCCAGTGAGAGCAAGGTTGTTGTTTATGTTTAT
75 TTACTTTAAGTGTGAGTGTGCTGCTGACATGCTGCTGTCACAGTGTGCTGGTGTCTAATGACATCAGAAAGTGGCATTTGA

15

40

55

1

ACCTCAGCCTCCCGAGTAGCTGGGACTACAGGCACCCGCCACCACACCTGGCTATTTTTTTTTTTTTTTGATATTTTATAGTAAAGA
CAGGGTTTCATCGTGTAGCCAGGATGGTCTCAACCTCTGACCTTGTGATCCGCCCGCCTCAGCCTCCCAAAGTGCTGGGATTAC
AGGCTTGAGCCACCACACCCGGCCTGTAGGTTGTATTTCTATTTTATGAGGAGAGACTTGACAGTTTCAGGCTAGTACCTGAGGT
TTCCTTTCCCAAGCAGCTTATAAGCTAGAAAATGGCAACTGCTTTTTGTCCCTCAGACCTGGTATATAGGCATATTTATGTTGGCT
5 TGCACGGTTTTGTACTGTTTTCAACTCAAGTAATATAGATATTTAGGAAATTTCTTTTTTTTTTGTTTTGAGACGGAGTCTCG
CTCTGTGCGCCGCTCCCAAAGTGCTGGGATTACAGGTGTGAGCCACTGCGCCTGGCGGAAATTTCTTTTCTTTTGAGACACAGTTT
CATTCTGTCCCGGGCTGGAGTGCAGTGGCAGATCTCGGCTCACTGCAACCTCTGCCTCCTGGGTTAAAGCGATTCTTCTACCT
CAGCCTCTTGAGTAGCTGGGATTACAGGCGTGCCTCACCATGCCTGGCTAATTTTGTATTTTCAGTAGAGATGGGGTTCCACTAT
GTTGGCCAGGCTGGTCTTGAAACGCTGGCCTCGCTGGTCTTGAAACGACTGGCCTCAAGTGATCCACTCACCTCAGCCTCCCAAAG
10 GCTGCGATTACAGGCATGAGCCACCACCCAGCCTTTTCTTTTCTTTTGTAGTAATGGGGTCTGTGTGCTGCTCCTAGGCTGGT
CTTGAAACCTCGCCTCAGTGATCTCCCACTTAGCCTCTCAAAGTGACGGGATTGACGGCGTGAGCCATCATGCCGATCTAAG
AAATATTATCTTGGGGAACAGGGAATCTATGGCCACACTCATTACTATGGTGTAGCAAAAGTCTGAAGCTAAGCAGTACTTTTTG
AGCTTTGGATGGGACATGTGCTATCTACTGTGTGCTGGCCCCAACAGCTCCCTTAACCCATGTGAGTTGCCATTATCATGTGGTG
15 TATGCTGGTGTTTTTCTTTTTCTTTTTCTTTTTCTTTTTTGTAGATGGAGTCTCGTTCTGTAGTGCAGGCTGGAGTGCAGTG
GCACGATCTCAGCTCACTGCAACCTCCGCTTCCCGGGTCCCGGTTCAAGCAATCTCTTGCCTTAGCCTACTGAGTAGCTGGGATT
ACAGGCACCGCCTCACCATGCCAGCTAATTTTTTGTATTTTTTACTAGAGACGGGGTTTACCATGTGGCCAGGCTGGTCTTGA
ACTCCTGACCTAGTGATCTGCCTCGCCTCGGCTCCCAAAGTGCTGGGATTACAGGCGTGAGCCACCGCGCCAGCCTGGTGT
20 CTTATATCCAGTTTGTTTTTATTCATTAACCAAAAAGATTTATTGAGCCAGAGTGGTAGTGACGCTATAGTCCCAGCTACTT
GGGAAGCTGAGGTGGGAAGACCTTGAGCCTGGGAGATAGAGGCTGCAGTGAGTCTGTATCATGCCACTGCTCCAGCCTGGGT
ACAGAGTGAGACCTGTCTCAAAAAAAGCAAAAAAAGCAAAAAAAGCAAAAAAAGCAAAAAAAGCAAAAAAAGCAAAAAAAGCA
TTTGGTGGTGGTGGTGGGAGTAGACAAGCTGTAACAGAATATGCAAGCAAGTATATGCTATACTAGTGATCAGTGGAAGCAG
AAAAATAAGCAGGGAAGAGCATAAGAAAGTGTGAGGCTGGGAGCTGGCATTAAAAATTTAGGTAGGATGGCCAGGAAGGCTG
25 TAAGAGGAATGCAACTTTTGGACTTCTGAAGGAAGTGAGGAGTGGGCGATGTGGATATCCGGAGGCAAGCACTCCAGGCTG
GGAAACAGCAGTGCAGGAAGAACATGTCTGCCCGTGTGTTCCATGAACCGTGTGGCCAGAGCAGAGTGAGGGAGAGTAGTGGGAA
ATGGGGTGGGAGTATAGATGCTCAGGGTCTTTGGCAGTCACTCCAAATGAAATGGGGAGCCTCTGAGAGTATGGGTGGAGACT
GACTGGAGGGCCAAAGGTGGGTGAGGAGACCCGCGAGGAGTACCCTGTAATCCAGTGAAGAGATGCACTCCGACCGGG
GGGTGAAGTGGAAATCGAGAAAAGAGGGGATTGGAGATGTATTTTGTAGCTAGAATCAACAGAAAGTGGGTGCGAGGTTGGATG
30 TGGGGACCAAGTGAAGTCAAGGAAGAACTGAGTTTGGACAGAGGAAGTAAACAGAGGAGGAAAAAAGAGTAGATTTTGAATAATT
TTGAATTTAATAGCTCCTCTGTGATCTGCTGATCAGAGTGTGGGATTGTGTGGGATTGAGAAAAGAGGAGTCAAGAAATGACA
CCAAGTGTGGGCTGAGCCTTGAAGGATGGAGTGGAGTTGCAATTTCTGAGATAAGCCTGTAGGAAGAGCGGGTTTTTGGGGAAG
ATTAGGATATCAGTTTGGAGAAAGTTGAGTTAACTGGCCTATCGGACATCCTTGTGGTGTGCGCAAGAGGCGAGCCTCCAGTATA
AAATGGAAATCAAAAACAGGTCAGTTACACCAACTCTGATTGGTAGTGCTGCCTAAAGTGCTGTGTGGGATTTTAAATGCCCA
35 ATCTGCGCGCTCGGCCCTCCCAAAGTGCTGGGATTACAGGTGTGAGGCCACTGCACCCAGCCTAATTTTGTATTTAGTAAAGATG
GGGTTTTGCCATGTTGGCCAGGCTGGTCTGAACTCCTGACTCAGGTGATCCGCCACCTCGGCCCTCCCAAAGTGCTGGGATTAC
AGGTGTGAGCCACCGCGCCAGCGGAAGAGTGTCAATTTTACTGATAGGAATGGACAAGCAAGAGATTTTAAAGATTAAATGTA
AATATTGTAACCAATATACAGATGCTCATAAATAGTACCTGGAAATCTGTAAGCAGCAGAGATAGCTCTTGATTTCTCAAAGAAAA
40 AGCTAAATATATGATGTTGGTTTACTGCTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTGTAGACAGGCTCTGTTGCCAGGGTG
GAGTGAGTAGTGCAGTCTGGGCTCACTGCAATCTCCATCTCCAGGCTCAAACTTCTCTGCTCAGCCTCTGAGTAGCTGGGATTACAGGCATGCGCCAC
GACTACAGGCGTGCGCCACTGCGTTCCGCTCAATTTTTTATTTTTTTTTTTTTTGTAGAGATGGGGTTTACTGTTGTGGCCAGGCT
CTCAAACCTCTGGCCTCAAGTGATCTGCTGCCCCCTGCTCCCAACGTGCTAGGATTACAGGTGTGAGCCACCGTGCCCGGCCAAC
TTTGTGCTTTAAGTCCCGCAATCACAACCTAACTTTTAAAAAAGGGTTCCACCAGTGCCAGCCTCTTCTATGATTTTAAACA
45 AATCAACCCATTTCTCTCAACCACTCTGTGGGGGGTACTACTGTTATCACCATTTTAGAAAAGGAACTGAGGCAGAG
AGGTGGTTTAACTTAGCCAAATTCACAGTGAAGGAGTGGAGTGGCAGAGGGGTGCGCTCAGGCGCTGGAGGCTCTCTCCAT
ACGCTAGACCATGTGTTTACCGTTAGAAGCCAGGTCTCAGGATTGCTAGAGATGCAATTTAGGAGTAGGGCTCTGTGCTGCTCA
AACTTTTGCTTTTCTAGAGGGTTATGGATGCATGTTTATAACAGAAAGGGTACTCCTTGAGAAAGGAATAATAATATCATT
50 CAGAAATCTACTCTGAATGCTGCTTTTGTGCGAGGCACAGGTAAGACATTTTCTGCTTGTAAATTTAGAACATCATTATA
GGGCTATTATATTATCCCACTGGATAAAAGAGGAAGCAGAGAGGTTCCAGTAATCTCTCAAAGTCATAAGCTGTGGAGCCAGGT
TTGAACGTAAAGCAGTCTGACTCCAGAACCTGTTTAGCACCCCTGTTCTCAGCCCCATGGCTCGCTTGGCTCTCCCCAGCATC
TCAATGGGCTGAAGGTAACTAAGCCTGCGCATGGGACTGTGGGTTGATGGGCTCACCCTACCTTGTTCAGCTCTCACTTC
TCAGATGCGGACTTTTTTTTTTGGAGACAGAGTTTCTGCTTGTGTGCTGCTGAGTGCATGGCAGATCTCGGCTCACTGCA
GCCTCTGGCTCCAGGGTTCAAGTGATTCTCCTGCTCAGCCTCCGGAGTAGCTGGGATTACAGGCATCCACCACCACTGGCTAA
55 TTTTTGTATTTTGTAGAGACAAGGTTTTACCATGTGGCAGGCTGGTCTCGAACTCCTGACTTCAGGTGATCCACCGCTCT
GGCATCCCAAAGTGCTGGGATTACAGGCGTGAGCCACCGTGCTGCGCCAGATGGGGTATTTGTATGATGAAGAGGAAGAGAAAG
AAAATGTATCTTCTCCTTGGGGTTTCTTATTTGGCCTGTGCAATCCATTTCCACCCCTCCTCCAATTTGCCATTTTATGACT
TTTTCTAACTGGATGTACCTGGGTAGAACTCTCATATTTGGCCCTGGTCATTGCTTTGTCTTTAGTATTTTGTAGAAAAA
60 CAAAAACAAAAACAAGAAAAACAAGAGGAGCCTTATTTCTTGGAGTGGAGGTAAGTGGTGAACCTTGTGCTGGTCTGCTGATGAG
CTCACCTGCCTCCCACTGGCCAGTCTTGGCCCTGAAAGTCAAGGATGATCTAGCTTAGGCAATGGCTATTCATCCAGGGGTGA
GGCAGAGTATCTCTCTAAAGTCTGCTCACCAGGAGTCCCGTCCCCATACTACAGGTTACATCCAGCTTCAGGACTAGTCA
GTCTATGTGGCCCTCCCTCAATTAATAAATCAGCAACTAATTTGGCAGGTGCGGTGTTGTGCTGTAATCCCACTGACTTTAGGA
AGCTGAGGCAGGCAGATCACTTGAAGTCAAGGATTCGAGACCAAGCTGGCCAAATGGTGAATCCCGTATCTACTGAAAAATACAA
AATTTAGCCGGGCTGGTGGTATGCAACCGTAATCCAGCTACTCAGGAAGCTGAGGCAGGAGAACTACTTGAACCCAGGAGGCAG
65 AGGTTGCAGTAAGTGTCACTCCAGCCTGGTGACAGAGCAAAACTTTGTGTCAAAAAAACAAGAAAAACAAGAAAAACAAGAAAA
CACAAAAACCCCTTCTATTTGTAAAAAAGAAAAATCCACCGTGAACCAAAATTAGTAAAAACAAGTAAATTTTGTGTTT
TGCAAAATGTATGATAACAAATGTTAAGGAAGGTGATGTGCGGTTATGGTTCACTGCGAGCCTTGAACCTCTGGGCTCAAGCGATC
CTCTGCTTGGCTCCTAGTAGCTGGGACTACAGGCTGTGCGCCAGCAGCCTTATTTTTTTTTTTTTTGTAGAGA
TAGGAGTCTTGTGTTGTGCTCAGGCTGGTCTTCACTCCTAGCTTCCAGTGATCTCTGCTCAGCCTCCCAAAGTGCTGGGCT
70 GATGGGACATTTTTATACATAGTGCCATGTTACTATAAATGAGAAGTTTTAAAAATCTGATTTTAAAAATTAATTTATGTCAAGA
ATTTTTATAACCAAGGTTAAAAAACCACCAAAAAATGAAAAAGGTTAATATCTTTGAGAGGTGATGAGAACTTATAAGTCAAT
AAGAGAAAAACAACATCCCTATAAATGAATAAGTCAAGGACATGAATGGGTAATGTACATAAGAAATGTAATGTCTAGTAATATG
CCAAATAGATTTATTTACTAATAAGCCACTTTCACTCTCTAGTTGGCAGAGTTGTTTTGAAAAATAGATATGAATGATGGTG
GAAAAGATTGGTTAACTATTACAGCAGGAAAAATTTGGCAATTAGAAGTGTATCAAAAGCCTTAGAATGTTTCAACCTTAGATTG
75 GGAATTTCACTCTAGAAATTAATCACTCTAGAAATATCATGAGTGTGCACAAAGATATTACCAAAAAATATTTTACAGTA

262

CCCAGTCTCAATGCAGAAAAGCAGGTTATAATCAGCTATATGGGATCTCAGACCCCTCCAGTTTGTAGTGGGGACACTGAGGGTAT
AGAGAGAAGTGACTTGGCCAGGTCTCAGAGTGAACAGGTTGGGAACAGAACCCAGTCTCTTGGCCCTAGTTGTGTTCCCATACT
AGGGAGTGTCTTGTCTATTCCCGGACCTATGGAAGTGGCAGTTGGTTCTGATCTCTAGGAAAGATACTCTTCTGTCTTCTCTC
5 CCTTGCTGATATCTTGGCCACCCACTGCTGGAGTTTCCAGCATGTCTCTGCTCTACTCATGCTGCTGGCAGCTTTCAGAGGAG
TCGGAAGTCCATGCTGGCCGTTATCTTTCAGGTTTCTTCTCTCATGTTCCCTTCTCTCTCAAGATTATACCTTTGCCATG
TACCCGCCATCCATGATCGCCACGGGAGCATTGGGGTGCAGTGCAGGCTGGGTGCTGCTCCATGTCCGGGGATGAGCTCAC
AGAGTCTGTGGCAGGATCACTGGCACTGAAGTGGTGTGCTGGGTAGCTGGGCAGCAGCTCTCCATTATAGTGTGCTAT
GCCCTGAGCTCCAGTAGAGGAAACCTCCAAACCCCAAGTGGTCCCAAGTCTGTTTCCAACTTGGGGCTTGTGGCTTTT
10 ATCTCTGCTTGGTCTGGGAAGAGCAAGTATCTTGGGTGGGTGAAGGGCACTGGCCCTAGGGGTTCTTTTCTGCCAAGTGGT
GTGCTGGAGTGGGGTGGGGGTTTGGTGTGAGATGCAGGGTGTCTCACACTCCCTTGCCACATCTCTTGTAGTTTCTGAGA
ACTAAAGAGCGATTCTGGGGCCGGGCTGTGGCTTAACCTCCCCAGACTTCCCATGTGTGTGGAGCTGTCTTCCCTGACCTG
CTGCCAGATGCTATGGGGGAGTGTGTGCTCTCACTCTTCTCCATGTTCAGGAGTCTGCTGCGGGCTGTGAGGAGCAGATCG
AAGCTGCACTCAGGGAGAGCTCAGGGAAGCCGCTCAGACAGCTCCAGCCAGCGCCAAAGCCCGGGCTCCAGCAGCCAA
GGGCCAGCCAGCAGCAGCACTCTACAGATGTACAGCCATACACCTGTAGCCCTGGAGAGGCCCTCTGGAGTGGCCATTAAGCAG
15 AGGAGGGGCGCTGCCACCCACCTCCCTGCTCCAGGAACACACCATCTAAGCCTGAAGGGGCGTCTGTTCCCTTCCACAA
GCCAAGGATCTGGTCTTACCATCCCGCAGTGTGCACTAAGGGGCCCGCCAGCCATGTCTGCATTCCGGTGGCTAGTCAAGC
TCTCTCTCCCTGCTATCTGACGAGCAGCCCTTCCCAACTCTAGCTGGGGGTGGGCCAGGCTGATGGGACATAGCCATACATAC
ACCAGCATCTCTTTGAACGCCCCCCCCACCCCTGGGGCTCTCATGTTTCAACTGCCAAATGCTCTAGTGCCTCTAAAGG
TGTGTCTCTCTAGGGTTATGCAATTGGATTGGGGTCCCTCTAAATTTAATGATGATAGACACATATGAGGGGAATAGTCT
20 AGATGGCTCTCTCAGTACTTGGAGGCCCTATAGTGTGCTGACAGCTGCTCTAGAGGGAGGGGCTAGGCCCTCAGCCAG
AGAAGCTATAAATCTCTTGTCTTGTCTTCTGCTCAGCTTCTCTGTGTGATTGACAGCTTGTGCTGAAGGCTCATTTAAT
TTATTAATGCTTTGAGCACAACCTTAAGAGGACGTAATGGGGTCTTGGCCATCCCAAGTGGTGGTAACTCCGTGGTGTGCTGT
TTTCTCTCTCTGCTACTGGCAAAGGATCTTGTGGCCAAAGGAGTGTCTATAGCCTGGGTGGGGTCTAGCCCTCTCTCCCAT
25 GTGCCCTCTGCCCCATCTCCAGCAGGGAATGACAGCAGGGATGCCCTGGAGGTGGCTGAGCCCTGTCTAGAGAGGGAGGCAAG
CCCTGTGTACACAGGTCTTCTAAGGCTGCAAGGTTTAGGCTGGTGGCCAGGACCATCATCTACTGTAATAAGATGATGTTGTG
AAATAAACTGGCTTTGGCTTCTGGATTGGTGTGGGTAAGTCTATTCTGCACTGTATGAGTAAGGAGTGGAGTCAATGG
TCTAAAGCAGGGATCATGAGCCTTTCTGTAAGGGCTGGATATTTAGGCTTTTGGGGTACATGGTCTCTGACCCAAATATAGT
CAGTTCTGCTTTATAATGTGACCTATGCGTCTCTAAATCACTATGCCATGCAAAATGCAATAAAGACACAGGCTCATGG
30 GAAAAATGGGGCTTGAAGCACAACCTCAATGAGTGACACATTTAAAAAAGGATAGCTTGGTTTACATATGTCAAATGGT
TGAGAAATTTATACAAATAATATGGCTTTTATCTTGAAGACATGCACTTTGCTTTTGGAGTGGAGCTCGGAAGGCTTGGCTCA
ACACAGGTGGGAGATGAGTGAAGTAGCTGTGATGTTTAGGTGTGAGTTTGTGTACTACTTAGGCTTGGTTAGCTAGATACA
GTTTCCCATATTACCTACTATTTCTCGAGGATGAAATCACACACAAGCAAAATGAAGTCTGCGTTATGATCAAACTGTTCCCAA
ATATATTAATGGGTGGAACAAAATGCGCAATTCGAAAGCAAAATACAAAGGGTTATAGCAGGATATATACTTAACTCTGCTGTG
35 TAGCACAACCCAGCCACAGAAACATGTAATGGGTGAGCATGGCTGTTCCAAACAAACTATTTATGGATGCTGAACTGGAATT
TCATGTAATCTCTACCTATCAAAATACCTGTTTAAATTTTCCCATTTAAAAATGGAATAATCATTTCTAGCTCATGGGCCAC
ACAAATGAGCCTTGGGCTGGGTGCGATGGCTCATGCTGTAATCCAGCACTTTGGGAGCCGAGGCGGGTGGATCACTGAG
GTCAGGAGTTTGAAGCAGCTGGCCAACTGGTGAACCCCTTCTCCACCCGCTCTCTACTAAAAATACAAATTAGCCAGGCG
TGGTGGCAGCCACCTGTAGTCCAGCTACTCAGGAGGCTGAGGAGGAGAACTCTTGAACCATGGAGGCGGAGGTTGACGCGAGC
CGAGATCATGCCACTGTACTCCAGCTGGGCGACAGAGCAGACTCCGCTCTCAAAAAACAAATCAACAAAGGAGGCTCTGGC
40 CTAAGTTTACTAGTCACTAGTCTAAAGCTTTTATGGCTGAAAGCCAGAAAGGAGGCTGTTGATGCTAGCTCTGATCTAACCA
TTCTTGGGCCAGCCTTATTCTCTGGCCTTTTTTTTTTTTTTTTGGAGACAGTCTTGTCCGTGGGCCAGGCTGGAGTGTAGTGGCC
CCAATCTGGATCACCGCAACCTCCACCTCCAGGTTGAAGCGATTCTCCTGCTCAGCTCCCAAGTGTGGATTACAAGC
ACCGCAACCAACCCAGCTAAATTTTGTATTTTGTAGAGAAAGGGGTTTCCACATGTTGGCCAGGCTGGTCTCGAACTCCTGAACT
CAGGTAATCCACCTACCTCAGCTCCCAAGTGTGGGATTACAGGCGTGAGCCACCAAGCCAGCCTCTCTGGCCCTTCTTGAAT
45 CTATCTCTGCTTTCCCAAGGAGTTTCTCTGTAGTCTTTTCTCATCAGTGTGAGACAGGACCTTTGGCAACCTCTCTCT
GGCTGTGTAGCCTGTGATGGGGGAAGGACAGGAGTGTGTCCCTGGGGGCTAAACAGGTGAGTGCAGCTGGAGAAACAGCTTG
GAGATCAAGGGAGGTGGGTCTATATAACAGGACAGAAATGTCCTCGTCTCTCAAAATACTAACAGGAGTATGCTACCTCCAT
TGACTACACCAACACAGAGGTTCAATAAATATCTGTCTTTGCTTTATCCACAGTGACCTGACACATAGCCATAGAAAAAGTAC
50 TCACACCAAGCCAGCTGGGAGTGGGACTGACATATGGTATCTCAAGTTGGCTCTCAGAACTAAACAGGGGATAAGGGCCCTA
GAATGGAAGAGGGAACAGCCAGACCTCAGTCTTCTGTCTGAGTGGGAGCCACAGATGCTCCTGTGATCTGTCACTGCTGCT
GATCTGGGTCTTACGCCATTAAAGCTCAGTGTCTCTCAGTACCAACGGGGGCTTGGTGTCTTCCAAACCCCTTTGGCCAGG
ACAGCTGACTGTTTCTCACTCCAGGTGATGGGAACATCTTCCACATCGCGGGGAGTGCATCTGAAGCTCAGCCTGATTCTT
GGGCGATAGCTGTGGATGGGCTGACGCGGAGCAGTTCTAAGAGGGCTCTTCTGTGTCTGTGGCCAGTGGCCTGTAGCGCT
GGACCAAGTCAAGGAGGCACTGGTGCACAGCAGCAGCTTACGCTTCTGTCTCGGAACCCAGGAGGTGGAAGCTAGGGCA
55 TCCAGCACCCGGTAAGGCACTGATCTTCTTATCCAGCAGCTGCGAGGAAGATGCTGTTGGCACCCGTGATTCCATCTCAGC
AATTTTCAAGCATGGCCGCACTAGTGGAAAGGAGGTGGGTAGAGTAAGCAGGAAAAACATTGGAAGAAGGATCTACTTCTCCC
TCTATGCTTTCCCTTTTCTTCTCCCTCTGCTGGCCCTTACATATGTTATCCCGAGGACCTTCTACCTACACAATCATAT
TATACTCCCTTGACCTCAGTCAACCTCTCTACAGGATCCACCAATCTCTATCTCTAGCATAGACTTGTCTTTCAGTAACCA
CTAGAGTATGGTCCAAACATCTCAACGCTCTCCACCTTAACCTTCTTCTGCTTCTTCTACTATTGTTTATCTATTACTGA
60 GAATCTACTTTATGCCAGGCACTCGGGCCCTGTTGTGCACACTTACATTGAGGGGATAATGATACACCTACTCATTGGCTTAA
ACAAGCACAACCCAGGCTTCTCTAGCTCTTCTCACTCTGCCCATTCCCAAGTCTGGCAATCCACTACTCTGGATATCCAC
TGACCAGCCCTTCCACCCCAAGCAATACTACCTGGAGTGCAACACAGGGATGGAGCACTTGGTATGATGCTACCCCAATGAT
GGCTTCCCGAGGGTACAAGTGCCAGACTCGCACTGGAATCAGGATCCCTAGGGAGAGTCAAAGGGCAGCCACTGTGAGCCAG
GATGAGAAAAAGGAGTTACAGCAGGAAGCATCCACCCAGCCAGGGACAGCTAGCAATTTCCACACCCAGGCTGTGTGTTCC
65 CATAGAAAGCTCAGCCCTTCCCTTCTTCCGTGCTCTGGGATCCACCTTGAACAGGCTCCAGGTTTGAACAGGGGCTTCTT
GAGAGCCATGTAGAGATGGAAGTTGAGTCTGTTGATTAGCAACCTCATCTGTAAGTGGAGGAGCAGGACAAGGTTGTAGAGC
GCTGGGCCATCGTCTCTTCAAGTTAGAGGCAAAATCTAGTGGGAGTTAAGCGGGGAGGTTTCCAACTCAGCAGCAGTCTGG
ACCCGGCCCAATAAATATCAACATGAGTATGAGTGGTCTTAAAGTAAATATGGGACCTTCTTCACTGGGGGATGTTG
TGGAGCTGTGTGATGCAACACCTCAGCTTAGAGAGAGAATAGGAGGGCAATGAGATATACCAATAGGAGACCGGTTTG
70 TCTGTGGAGAGCCAGAGCTCGTGCAAACTGATGGCTACTCAGCATCAGTTGATCTGCTAGCCCTGAGCATGCTGGGCAATCA
CAGACTCTGAGGCTCTGCTACAGGTTGATCCAGTGGCTATAAAGCCCTCTCCCTAGAAATTCATCAGAGGGTTGTATC
CCAGTATATAAAGCCCTCTCCCTAGAAATTCATCAGGAGGTTCTTAACTGGTGGGCTTGGGCCCAAAATAGACA
CAGGAAAAGCTAGAAAAATGATGCTATAAAGTAGCACAGAGGGGCTGGGGCAAAGCTCAAATGCCCTGGGGCCAGAGGCAAGG
AAAGCCTGTCCGTCCTCAAACTCAGCTGCACCTATAAACCAGGCCCCGAAACCCAGCTACTCTACTGGTGGCTGGTACAT
75 GGCAGCTGCAGTCCAGGCTCCGGCTCTGTGACGTAGAGGATTTGCTCCAGTTGGAGAGTGCAGGGATGATCTTAAATGCCTTGG

GCAGTTTTCCACTGCGGTACTTAGATAATACCTAGGGATGAGGGAGGTAAAACAATCATCGTCATCCACATATGGCAAGCTTGCTG
 TGGGCTAGGAACCTGTCTGGGTGCTTTTAAATATATTAACCTCATTGTCATCCCAACAATAACCTATAAGGAGGTGCCATTATTATGCT
 CATTTTACAGATGACCACTGAGAGTCCAGTAACCGACCCCAAGGATGCCAAGTCAATTACAGGCAGAGCAGGAATCTGAACCCACA
 CACTCTGCCCTCTTAGGTCTGTTTTCTACTCCCATGACTCTTTAGTATGCGATGCAGGCAAAAGGCAAAAAGCCTGTGGCAGGAG
 5 CCCACAGCCCCCAAGGGGTCTCCACCATGGCTCCCTCTCAGCTCTTACCTCCCGGACCCCCCTGTACACTTCTAGGACCCGGG
 GGTCCAGCTGGGGCATAGGGAAGCCGACACCTCTGACATGACTGTCTCAACCTCTGTCTGCTTCTCAGTCACTTCTCCATGATG
 ATGTCAGCCAGGGTGCCTTAAGAGGGGAAGTGCCAAGAGGGGAGAGAGGGGGCAAGGAGCACTGTGGTCACTGTCCAGGAAG
 CTCCAGACTCCCCACAGTCCCTGTGAGCACCGCCATACTGCGATCCTGCTGGGATATGCAGCTTAGAGTTCTCTCTCTGTGCCCA
 TTCACTCCACACAGACAGAATCACTGCAGGGTGCAAGGAACCTGAAAGTCATTCCATTAGGACAAAGCTAGCAGTTGTACGGAGG
 10 TTATTATGAACCTCAACTCTGAAGTCAGTCTGCCAGGTTCAAATCCTGGCTCACCACTCCCTGGTATGATCTTGGGCATGTTAC
 TTTACCTCTCTATGCCTCTGTTCTCTCATTGTGAAATAGGGATAATAACGGTACCCACCTTAAAGATTAAATGGAAGGATTAAAT
 AAGTTAATGTCTGTTTACTTGTGAATGGTCAGTACACAGTAAGCGTTATCTATGGAATATTTCTAAGACTGATTATATTCTTT
 TCAGCCTCCTTAAACAGTATTGTGGGTGTATCAAACATAATCTTATCTTAATGATTAGAAATACCATCGCCTTGAGCTGTCTATA
 TAATACTAGCATCTTCAGAGGCTGCTGAAGTGTATTTATTTATTTTTTTTGGAGAGAGTCTACCTCTGTGGCCAGGTTGGCATG
 15 CAGTGGCACCATCATGGCTCACTGCAGCCTCTATCTCTGGCTCAAGCGATCTTCCGCTCAGTCTCTCGAGTGTGGGACCA
 CAGGAACATAGTACAAGGCCAGCTAGTTTTTATTTCTCTGTAGAGATGGGGTCTCCCATGTTGGCCAGGCTGTCTCAACATC
 TGGGGCTCTCGCCTTGGCGTCCAAAGTGTCAAGATTACAGGTTCTGGGGCCACCATGCCAGACTGAAATGTATTTAAAGCTGCTTC
 TCAGTTGGGCGCAGTGGCTCAGCTGTGTAATCCAGTACTTTGGGAGGCTGAGGAGGTGGATCAGTGAAGTCAGGAGTTTGAGA
 CCAGCCTGGCCCAACATGGTGAACCTGTCTCTACTAATAAAACAAAATAGCCAGGCGTGGTGGTACGTGCTGTATCCGAGC
 20 TACTCGAGAGCTGAGGTTGAGTGAGCTGAGTGCAGTGCCTCCAGCGTGGGTGACAGAGTGTGATCTGTCAACAAAACA
 AAACAAAACAAACTGCTCCTCTTTCTGAGGTCTTACTCAATGCCAGGCACTGAGTTGGGACTTTTCTGCTCTAGAGTCAGCG
 CAACACTTATAGGACACGGAACCTATGAGACATGGGAAGTGGGCTCAGGTTAATAACTCACCAAGGCCCTCAGCTGTGAGG
 TGGGGCTTGAAGTCAAACTCAGGTTTGGGAAGTCTTGAAGTGGTCTTATAGTACCTTATAATGTGCCCAAACTAAATGG
 CCTCTGATTGTTGAATTCATGTGGATCTAGGCTGTCTTCTGAAGATGCCAGCTATCATTTCTTACGACTGCCAGGAGTCTGATT
 25 ACTTCAAGGAGCTGTCTACTTATTTACTACAGCTGGAAGCACTTCTGCTAAATGGTCAAGTATCAGTGAAGTAGGAGTT
 ATGAGGTGCTGAGTGAGAACCTGAGAGGCTCTTGGGGGACAGGCCAAGTACATACTTTATGACATATTTTCAACTGTAGGCT
 ATCAATCTGGGAGAGGGGCTCATTTCATTTCTTCTGCTTCTCAAATAAGCTGCCACAGAAATTTATCAGCCTCCCTGTCTCT
 TTTATAGTATGATTAGCAATGAGATGCACTAGCCCAAAACAGCCTAAAGTATCAGGACACCAATTTATGTTAATACACAGGCTCAG
 AATGAACCTGGTTGAGGACCTTATCTAGACTCCACTCCAAAGGCTTGAAGTCTTGAAGTGGTCTTGAAGTGGTCTGAGGTTGAA
 30 AATGCTGTGATGTTTGGAGCTAGCATTTATTTATAGATGGGAATAAATAGTGGTCTGACTAGGGGAGTCTGCTCTCCAGAGG
 ACATTTGGCAATGTCTGATGTCTTTTGGTTTTCAAACTGGGGGAGGTTGCTACTGGAGTCTAGAAGTAGAGATCAGAGATAT
 CTACTAAACCTCTACATGTCACAGGACAGCCTCCACACACACAAAATTTACCAGCCCAAAATGTCAATAATGTGAGGTTGAA
 AAACCTTGGCTTAAATGAAGCTTAGGATATGAAGACTTGTCCAAGGAAGTTGAGCTTACCGCTAAAAAACTAAGAATACCAAAAC
 CAAATGCAATAGGATGGCTCTCCCAAGAGGTGTAAGAGGGGCTGGAACTGTTTCCCTGGCAACTGGGAGTGTACAAACAAATGG
 35 ACATAAGGACACAATGTTTTTGGAGGCTGGGTCTTCTACTCACAGTGGTCTTTGAGGATGGGCACTTTTGTCAAGGTGGTCTC
 CATAAGCTAGCAACTCCAGGGCTTCCAAAGGTAGGGAATCATAAGTCTGCCAGGGAACCTGTTTTCTGTGGGAACCTTTCTA
 CAAGGACTCATTATCCCAATCCCAAGGCTACCTGGCAGGAGGTTCTTGTTCATGAACATCTCTATGGCAGCTCATCTCAGG
 GTCCACAACCACTCTGCATGATGGCCGCTGCTGTCATTGTGGCAGCCTTCTCCAGGTTGGGCACTCTCTGCTCTGCTCATCTG
 40 ATCCCTCTGAGGCATTCTTGGACCTAGAAGAGGGAGACTAAATGGATGAGCACAGCAAAAGGTAGCTGAGGCTTCTGTCAGTT
 TAACTTTAGCCATTATGTAGTACAGGCTCATGTGGTGTGATAGACGCAAGGTATGTGCAGTGAAACAAATGCAATAGCTCCCT
 GTCCCCAGGGGCTGTCAATCATGCTTGTAGAAACAAATGTATATACAGGAACAATAAGAAAAGCAATGGCCATAAATAATAGTTA
 ACATACCATCTCAGTTATGTAGAAAGAACTTTTTTTTTTTTTTGAATGGAGTCTTGTCTGTCCACCTCAGTCCAGGAGTCACTG
 45 GGCTGGATCTCAGCTCACTGCAAGCTCCGCTCCCGGTTTCATGCCATTCTCTGCTCAGCTCCCAAGCAGCTGGGACTACAGG
 CATAAGCCACAGCCCGGCTAATTTTTTGTATTTTTAGTAGAGTTGGGGTTTACCATGTTGACCAAGATGGTCTCGATCTCTTGA
 CCTCGTATCCGCCCCCTTGGCTCCCAAAATGTGGGATTACAGGGCGTGAGCCACTGTTTCCGGCTGTAGAAGGAACCTTCTA
 AACACTATACCATGTTAATCTGTTTAACTCTTATAAACCAGAAGTGGCGGCGAMNNNNNNNNNNNNNNNNNNNACGGTGGCTCA
 CGCATGTAATCCAGCACTTTGGGAGGCGGAGGCGGCGAGATCAGAGGTCAAGAGATCGAAACACCCCTGGTCAACATGGTGAA
 50 CCCCATCTCTACTAAAAATAAAAAATAGCTGGGCGTGGTGGTGGGAGTGGGAGTCCAGCTGCTCCAGCTGGTGACAAAGCAGACTCCGTC
 TCAAAAAATATATATAAAATAAAAAAATAAAATAAATCTTCTTATGGAACAATGGCAAAATAAATAAATAAAGAAATAAACC
 AAGAGTGGATACTATTACTATACCCAGTTTCAAATGAGGACATTGAAGCACTGAGAAGTTGGGTAATTTGCCCAAGACAGTAGT
 CTGGGTCTAGACTGATTTCTTCCACTATTCTACACATATTCTGGGTTTATTATATGCCACAAATAGTAGTAGACAAACATATG
 CACTTAAAGGATGAGTGGTGGAGACAGTTAGGAGCTGGATGGGAGTTGGGAGCAGAAGGAGTGTGTTCCAGACGACAGAGAAAT
 55 AAGGCTTGGATATAAGAGTCTCTAGGCAATAGCAAGAAATATGCTAGGTACGTGGGAAGGTGAAGCCAGACTGGAGGGCTTT
 AAATTGAGGAGTATGAGTTTCAATCCACAGTCCATTAAATACATGAAGTTGGCTGGGCGTGGCTCAGCCTGATG
 TCCCACCATTTTGGGAGACCAAGGCGGCTGGATCATGAGATTGGGAGTTGAGACCAAGCTGACTAACAGGAGAGAGCCCGTCTC
 TACTAAAAATACAAATTAGCCGGCTTGGTGGCGATGCTTATAATCCAGCTACTTGGGAAGGCTGAGGCATGAGAATCGCTTG
 60 AACCCGGAGGTGGAGTTGAGGTGAGGTGAGCGAGATCGCGCACTGCACCTCCAGCTGGGCAACAACAGCAAACTCTGTCTC
 AAAAAATAAATAAATAAATAAATAAATAAATAGGCGGGCGCGGTGGCTCACGCTGTATCCAGCACTTAGAGAGGCAAG
 GCGGGCGGATCAGAGGTGAGGAGACTGAGACCATCTGGCTAACACGGTGAACCCCGCTCTACTAAAAATACAAAAATTAGC
 CGGGTGGTGGGCGGCGCTGTAGTCCAGCTACTCGGAGGCTGAGGAGGAGATGGTGTGAACCCGGGAGCGGAGCTTGCA
 GTGAGCCAAAGATCGTCCACTGCACCTCCAGCTGGGCGACAGAGCGAGACTCCGCTTAAAAAATAAATAAATAAAGTTAGTC
 CATTAAATAAATCTGTTTTTGGAAAGCTACATGTCTGGGCATCTGGAAGGGGTCTAATAATCCAAGTGGGAGCTATAATGCT
 65 ACGTATCAATAGGTCAATTAACAACAAAGGAGTGTGTGATAAACAATAAAGGGGGAACAGACATTTTGTCTCCAGTTCCAAC
 GGTCCCCCAAAATTTGACTTTGAGGTGGTTCTTCTAGTGCCAGACCTAATCCAGGTGTCTCTGTAAAGCTGCTCTGGATGA
 CTCACAGGCACCTCAATCTACCCGTTATCACTAACTAATTTCTTCTCCCTCTAGGTCTACACTGCTAACCATCCACAGCTC
 AGTAAACGCGACCATCGTCCACCAATGCTAAGCCTGGGAGG

HUMAN SEQUENCE - mRNA
 70 GCGCCTGTGAGGGAAGCGCGCGCGCGGGCGGGCGGGGCTGGGGATCCGCGCGCAGTGCCAGCGCCAGCGCCAGACCCG
 CGCCCGCGCTCTCGCGCCCGTGCCTGCTTGGGACTCGCGAGCCCGCACTCCCGCCCTGCTGTTCTGCTGCCGAGATGAGAGC
 TGCTGTGTTGCGAAGGCACCGGCACGCGCCCGGGCGGGCGGACCCGCGCTGTGGGGGACCAGCGTGTCTGACAGAGCCTG
 CTCGCGCTGGAGAGCGCTACGTACCCCGCGCTCTACTTCCAGTGCCTGACGCGGAGATCAAGCCGCACATGCGGAAGATGCT
 GGCTTACTGGATGCTGAGGATGTGAGAGCAGCGCTGTGAGGAGGAAGTCTTCCCTGGCCATGAATACCTGCTGCTTACCTAC
 75 TGTCTTGGCTGCCCAAGGAGCGCAGTTGACAGTCTCTGGGTGCGGTCTGCATGCTGCTGGCTCCAGCTGCGCGAGACCAAG

5 CCCCTGACCATCGAAAACTGTGCATCTACACCGACCAAGCTGTCTCTCCCCGCCAGTTGCGGGACTGGGAGGTGCTGGTCTTAGG
GAAGCTCAAGTGGGACCTGGCTGCTGTGATTGCACATGATTTCCTGGCCTTCATTCTGCACCGGCTCTCTCTGCCCCGTGACCGAC
AGGCCTTGGTCAAAAAGCATGCCAGACCTTTTGGCCCTCTGTGCTACAGATTATACCTTTGCCATGTACCCGCCATCCATGATC
10 GCCACGGGCAGCATTGGGGCTGCAGTGCAGGCCCTGGGTGCCTGTCTCCATGTCCGGGGATGAGCTCACAGAGCTGCTGGCAGGGAT
CACTGGCACTGAAGTGGACTGCCTGCGGGCCTGTGAGGAGCAGATCGAAGCTGCACTCAGGGAGAGCCTCAGGGAAGCCTCTCAGA
CCAGCTCCAGCCCCAGCGCCCAAGCCCCCGGGGCTCCAGCAGCCAAGGGCCAGCCAGACCAGCACTCCTACAGATGTACAGCC
ATACACCTGTAGCCCTGGAGAGGCCCTCTGGAGTGGCCACTAAGCAGAGGAGGGGCGCTGCCACCCACCTCCTGCTCCAGGAA
15 CCACACCACATCTAAGCTGAAGGGGCTGTCTCCCCCTTCACAAAGCCCAAGGGATCTGGTCTACCCATCCCCGAGTGTGCA
CTAAGGGGCCCGGCCAGCCATGTCTGCATTTGCGTGGCTAGTCAAGCTCCTCTCCCTGCATCTGACCAGCAGCGCCTTTCCCAAC
TCTAGCTGGGGGTGGGCCAGGCTGATGGGACAGAATTGGATACATACACCAGCATTCTTTTGAACGCCCCCCCCCAGCCCTGGG
GGCTCTCATGTTTTCAACTGCCAAAATGCTCTAGTGCCCTCTAAAGGTGTGTCCCTTCTAGGGTTATTGCATTGGATTGGGGTC
CCTCTAAATTTAATGATGATAGACACATATGAGGGGAATAGTCTAGATGGCTCCTCTCAGTACTTTGGAGGCCCTATGTAGT
20 CCGTGTCTGACAGCTGCTCCTAGAGGGAGGGGCTAGGCCCTCAGCCAGAGAAGCTATAAATTCCTCTTGTCTTGTCTTCTGCTCAG
CTTCTCCTGTGTGATTGACAGCTTTGCTGCTGAAGGCTCATTTAATTTATTAATTGCTTTGAGCACAACTTTAAGAGGACATAAT
15 GGGGGCCTGGCCATCCACAAGTGGTGGTAACCTGGTGGTTGTGTTTTCTCCCTTCTGTACTGGCAAAAGGATCTTTGTGGCC
AAGGAGCTGCTATAGCCTGGGGTGGGGTCATGCCCTCCTCTCCCATGTCCCTCTGCCCCATCCTCCAGCAGGGAATGCAGCAG
GGATGCCCTGGAGGTGGCTGAGCCCTGTCTAGAGAGGGAGGCAAGCCCTGTTGACACAGGTCTTTCTAAGGCTGCAAGGTTTAG
GCTGGTGGCCAGGACCATCATCTACTGTAATAAAGATGATTGTGAAATAAACTGGCTTTGG

20 HUMAN SEQUENCE - CODING
ATGGAGCTGCTGTGTTGCGAAGGCACCCGGCAGCGCCCCGGGCGGGCCGGACCCGCGGCTGCTGGGGGACCAGCGTGTCTGCA
GAGCCTGCTCCGCCTGGAGGAGCGCTACGTACCCCGCGCCTCTACTTCCAGTGCCTGCAGCGGAGATCAAGCCGCACATGCGGA
AGATGCTGGCTTACTGGATGCTGGAGGTATGTGAGGAGCAGCGCTGTGAGGAGGAAGTCTTCCCCCTGGCCATGAACCTACCTGGAT
25 CGCTACCTGTCTTGGTCCCCACCCGAAAGGCGCAGTTGCAGCTCCTGGGTGCGGTCTGCATGCTGCTGGCCTCCAAGCTGCGCGA
GACCACGCCCCGTGACCATCGAAAACTGTGCATCTACACCGACCACGCTGTCTCTCCCCGCCAGTTGCGGGACTGGGAGGTGCTGG
TCCTAGGGAAGCTCAAGTGGGACCTGGCTGCTGTGATTGCACATGATTTCCTGGCCTTCATTCTGCACCGGCTCTCTCTGCCCCGT
GACCGACAGGCCTTGGTCAAAAAGCATGCCAGACCTTTTGGCCCTCTGTGCTACAGATTATACCTTTGCCATGTACCGCCATC
CATGATCGCCACGGGAGCATTTGGGGCTGCAGTGCAGGCCCTGGGTGCCTGCTCCATGTCCGGGGATGAGCTCACAGAGCTGCTGG
30 CAGGGATCACTGGCACTGAAGTGGACTGCCTGCGGGCCTGTGAGGAGCAGATCGAAGCTGCACTCAGGGAGAGCCTCAGGGAAGCC
TCTCAGACCAGCTCCAGCCAGCGCCCAAGCCCCGGGGCTCCAGCAGCCAAGGGCCAGCCAGACCAGCACTCCTACAGATGT
CACAGCCATACACCTGTAG

GCCAGAGCTAGGGTAGGGGTTGGCCACTGATGGAGGTGGAGAGACTCTCCAAAGAGATGCTGATGTGGGAGTCTACAAGGGGCG
 GGGGCGGGTGGGTGGGTGGCCCTCTGATACTAGGACATGTTAGGGGAGAGGAGTGCCTTGTACAGAAAAAGAGAAAGCCA
 GTGTTTTTTTGTGTTTGTGTTTGTGTTTAAACCATCCAAGTCAGCTTTGTGTAGTATTAATGTCTAATGATAAGGACTCCCT
 GTGAGATAGCTAAGTCCATTCTCACACCACAATTGAGGGTACATTGAGGAGCAGCTACCTCCACTGGCTTCATTTCTTTCC
 5 AAAGGACCCCTTCCAAATTACCCTGGGACCTGCCGTGCTGTTGGAGGATCACTGGAAAAAGGGACACCTGACATCTTCAGGTC
 TGGCAGACCTAGACCTAGAAAGGATACCTGTTCTGGGTGGAAGGCCCTGGGGTATCACAGGTCACCTCCAGAGATGCCAATCTGT
 ATCCCATAGCCAGTCTGCTGACTGTCTTAGGGCCTGCAAGTCTCCAGGTGACTCAGGGGTGCCTTGAGCCTCTAAGTGGAGC
 ACATCTGATCCCCAGGTAAGCTCCGAAATTGCACAGTAGATTAAGGGAATTCACTCACAAGGATGCCTCCTTAGCTGAGATCCCCA
 AAGATCCAGGCTGCATAGGACCTGAAGGCTCACTCACTCTGCTTTCCAGTCAGCAGCAATGTAGCAATGTAGGAGCCAGGAGCA
 10 CAGGGAAGGCTCTGAGCTCTGGACAGACACCTGCATCTCTTTGGGTGCTGGATCCCCCTACTCTTTGGCTTTCTGCAGGCCAC
 AGGCTTCCAGTCTGAGTCTTCACTTAGGATGATGAGGCCCTACCTGCATGAATAGCGTCTGTCTAATTTTTGTCTCCGCCAACCC
 CTCATGATCTCTCACTTCCAAAGGCCACCTGTCTGTCTGCTCTCTAGCTGTCTCCAGGAAATCACCCGAAATCGTTCGAGAGGC
 TCCTAGAGTTGTTAAGGGAGACCTTAAAGCTCCCTTCTCTGGTCAAGACCTTGGAGTCTCCCGTCTCTGTTGTTCTTCT
 GAGAATCTCTGCTTCAAGTCCCTTGACCTTCGCACCTGCTCCCTGCTTTGCCCCACAGTGGTTTTCTCCCTCCATTCTCTACA
 15 TTAGGCTAGGTTGGTCTGAGCCCCCACCCTCCCGCAGTTCACAGAGGGAACAGTCCAGCAAAATACATGGAATCAGTGC
 CTGAGTGGGAGATTTCCCTCCCTCCTCAGCAGACTGGCAGCCGAGTGGGGCGGGTGGGGGTCTAGCGGCCAAATTTCTTTGT
 CTTCAGAGGTGCTCAGCAGGGGTCCGGTGGAGCAGCGCAATACACACAGCCGCTGACCGATAAATCTCCGAGAGCGCACTTC
 AAAAGGAACCTCCCGCAGCTACTGAGGTGGGGTGGGGTCCCATCTCGGTCTGAAGTCCCTGTCTCAGTCACACAGCAGCA
 GGGCTTCCAGTGCACATCTTTGCTGAGGTCTGGGTCCCGATGCCTTCCCTCCCTCAACCAGGAGACACCTTCTGTCT
 20 AGGCGAGCCTCATATCCACCCTCAITGCTGTTTCAGAGTAAAAATAATCCTTTCCCGCATGTGCAGGCTACCTGATGTTGG
 GTGCTATCAAGAGAGAAGATGTGTCTAGGAGATACTCGTGGCAAGGGGCTCCCTCACTGCTGGGCGAGGTCCATTCTGTGCT
 GCCACCCGAGCAGGAGGAGAAAGAAATTAAGCTGTGTTGAAGGAAGGACCTGGCAAGAGAGAGAAAGGACTCCGGAATCCCC
 TCCTCTGGGAACTTTCAAGTGGGGGAAATCCCAAGCAGGCTTCTACTCTGCGGAGCAACATGCGCGGCACTCCCGCTTC
 TGGTCCCTCTCTCTCTCTGCTGACCTTTGCTGTTGTTTCTTCTACCTCAGAACAGCAGCTGGGGTGCCTCGGGCTCTGCT
 25 TTGCTGTGAAGAGCAGCTGCATACACAGCCCTTAAGGGAGCAGGATTTAGCCACACAGGAGCAGCTTCCACGATATCTCG
 CAGGCGCAACATCTCACCAAGCCACCAAGAGCCTTTGCCCGGCTCTCTTGGGCTGGCAGCTGTGAATCTTAAGGATCTAA
 ATGACCCCAAGAGCCCTCAGATTAGCTCTTGCTCCACACATAGCGGTGTGTTGGAGGCGAGAGAAAGCAAGTCCCTGTTT
 CAGAAACATTAATTTGGACTGCCCCCCCCCGCCCCAGCTCTGATGCGAGCTAGAGATTTAATCGCATAGATGTTACAGCG
 CCTATGGGAGCCCCATGGGATGAGCAGCAATCAAGATCTCAGCTAAGGCTACCTAGTAACCAAAAGCCTGTGAAGCAAGCTC
 30 TTGACAGAAGCTCAGCCCGGGGCTTGCATTCCCGATAGTGGCCAAACCCCTCTACTGCTCCAGGTAATCAGAAACG
 GGGCTCAGAAATCAGCGTGCCTTGGGAGGAATCTTCTGGGAATGCCCGCCCCCGGGGCTATTCTAGGGGTGCTTATCTCA
 GTACCATCTACAGCTCCACTAGTCTTTCAGCAGGTGGGGATGCTGCTGTTCTTAGCCCTCCCACTTCTCCCTTCTCCCTT
 CAACCCCACTCTCTCTGCTGCTGGGCTTCAACCCACCCCGCCCTGTTTCCGTCTCAGTGTCTCTATCCACTGTCTCTCT
 CTATCTCCCTTCTCTCCCTCTTCTATCTCTCTCTACCCCTCCAGCCGAGGATCGGGCTAGGAACTCGCAGAAGCTGTGACA
 35 AGCCAGGCGGCTCTCTGACCTTGTGCCCCAGGGGCGAGTTCCTGTCTCTTACACAGCAGAGCCATGTGCCGAGAAC
 AGCAGCAGGCGGAGTGGATCCGAGCTGTGGGACACAGCTTCCGCGATCAAAGGCTAGGAATGTCTGCTCCCGTAGGACTTCC
 TCAGTCCCATCCACCCTAACAGCAAGAAAGCCGCTTCTCTGGTAGGCAAGTTGGGTGGGCTCCCTCTCTTACCGTCTACA
 CAGTTAAGTCCCACTAGGCTTCTCTTTGGCTGCTTCTAGGTCACAGCCAGGAGCATTCAAGGGCTGAATGTCTTCTGTGT
 CCGGCTAGAGAGCTGAGTACCTAGTTAAGGAGTCTTCAACATCTAGGTATGATTGGGCTCAGACTCACTCCCAAT
 40 GTGGAGAACTGGTAAGAGAGTGGCCCTTGGAGGCTGAACAGTTCCTTGTATAAGAGCTTCAGTAGGTCTGAGGTGAATCTG
 GTGTCTGCACGGGACAAACGCTTAACACCAATCGCCAGGTTTGTAGTTCTCATCCGTAGAGGGTCCGGAATATAGGTGAGAGAC
 TGGACATAGGGGAGGTAGATGTTCTGAAGAGCCTCGCCCAACCACTAATAGACAGAGCTATACCGTGTCTCACTAGTCCCAA
 ATGCTTCTTCTTCAAGATCCAAGAACTGCAAGTACTGTGAGGTCCGCGCAGCAGCCTGACAGGAGGAGAAAGTACCGAATCT
 CCGCAGGAAATGCAACCGCGGCTGTGTGAGTTGCAAGAAATGCAAGGCTGACAGGAGTCCGATACCAATCTGACTCTTGAC
 45 AAAAGACTCAATGACACTAGCTCTGCTCCCGCGCGCGCGCTGGCAGACCTTCAAGGCTCAGCGGCTCTCCCGCGCGCC
 TCGGACACCTGGAAGGAGCTGCGGCGGGTGGCAGGGGCGCCAGCTCGCAGAGCCGAAAGGCTGGAGCTGGGAGGCTTGC
 ATTTCTAGCCCTGATCCAGTCCGCGGATCTGGAACAAACCCCTTGTCTTCTAGTCTCGATTCTTACGGGCCCAAGTGCCA
 AGGATCAGAGAAAGGAGCCACCATCAATGCCAAGCCGACCCCTTCAACAGTGAACGCGGGTCAAAGCTCCAGCTCCCTA
 AACCTGGCTGCTGGAATGGGAAGGGGTGTCCAGGCGCAGCAGAGAATCCAGCGTCCGGGTCTCCCGGCTCCGTCGCGC
 50 CGGGGCGCAGGCTTTGCCAAGTTTGGCGGAGATGCCCTTCCAGAGCCGAGTTGTGGGCGGGCGGAGGGCCCGTGATTGA
 CAGGCTGAACTCAGACTCATCTTACCTTAGGCGCGGGCGCTGATTGGTGTCTCGTGACATCTCAAAACCGGCTGCTCGGC
 GCTGGCTCGGAGGGGGGCGGCTGCGGGTGGAGGTGCGCTCTGACAAGCCGGAAGTCAATTTCAACCTCAAGTGAATTTGTT
 CCAACTATTGGGGGCGTCTCTCCCTCTTCTATGATCGCGGCAAACTTCTCTCGGCGCTGCTTCTAATGGAGCCCCACCTGCT
 CGGCTGCTACTCGGCTCTGCTCAGTGGCAGCAGGCTCTCGTGGCTACCAATTTGGTGGTAAGACTTGCCTCTGTCTGCG
 55 TGGGCCCCGATCTCTCGGCGCACCCGGGACCGTGGGAGGCGTGGCGGGTCTGGGCTGACAGGCGCTGGGGCTCTTTCTC
 CTTGCTTCCGCTAGCCCCCAGCGCTCCACCCCTCTTGGATCTTCTGCTGGTGTGCGCTTCCGAATCCAACCTCTGGCTTCTCAG
 ATAATCACTATTTCCCTGCTACCCGCGCAGAGGCGGGAGGGCTCTCCCTACCCCTGAAGGTCTCTCGTTCTTAGTCTTCACTC
 CTCACCCCAATTTGGGGTCCCCGAAGAACCTTCTGTTGCTCACACTTGCAATTTCTGTGCTGTCGCCGCGGCCACTCTCT
 TCTCCATTTTAGGCTCTCCGTGGTAAATATCTGCTCTTTTCCGCAACCGCACTCTTCCGTGTCTCGGTCAAGAGATTCTC
 60 CCCAATACTCGGTTTGCCTTCAATTTGAGACCTTAAGGGCTTGGGAATCCCAAGCAGGGGACTTAGGGGTATTTCAGTAG
 ATTCTCCCACTCGTTCTAGATTAATTTGAGCCTCTGAAGTACTATAGAATTTGCTGATCTAGATGCCATTGTGATCCGGG
 TGTATTCTGCTTCTGTTGCTTCCATCCCGAGAAAGCGAGGTGGGGCTCTTTGAAATGTACTTGTGTTGGGAGGGTAGGCTTG
 TGGTTTTTTTGGAGCAAACTAGTTCTCAATGTCAAATTCGTTGCTTTTGAAGACGGGGAAGCTAGGAGAAAGGGCGAGGGA
 GGGGAATGCTGCTCCTGAGAAATACGGATACAAAGGCATTTTAGTAATAAGGCTGGGCGAGCAGGCGGAGTACTTGGAGCTGA
 65 TGGGCTGAGTCAAGGATTCACTGGAAGATAAACCCCTTTTGGAAAGCCAGCTCCAGAGACTCCCTGTTTCCAAGCTCATTTG
 CTGCTCTCTCTGATAGTCTCCGGTGAAGACACTAAACAGTCTTTCTAAATTACACCCAGCCCTCTCAGTCTCCAGCCCC
 TGCATTCCGGAACCTTTAATAAAAGAACCTCCCTCTCTGGCAGTGGCTAGAGCCTTGGGGGGGTGGGAGGTGAGGAGGAGGA
 GGAATTTGGAACTCTGAGTAAGAAGGAGACTGGCCCTGGGGTGAAGTTAGAAGTGTACCAAGGTGCTACCAAGGTGCTACATGG
 CCCCCCTCTGCTGCTACCTGCAAGCCTGCAGTATGAGGCTCAGAGCTTATAAAATACTGGGCCACACCCCAAGCCTTTTCCAG
 70 ATGCTTTGGGGTGTCTGAAGGCCAGGGAGGGGGAGTCAAGAACCCAGGACCCCAAGCAGTGGCTGCCCAAGGTCTGTTTGA
 GGGTCCAGGAGTGTCTCTAGTTGATAAATACGCCAAGGACAGACCATCTTTCTTCTGTTGGAGTGGGCTGGTCTGAGGCTC
 GTGTGTGATCTAGAGCCTGTGATGCTGGGAGCAGCCAGGATTCACAGTGGGTTCTGCCAATTTGGTGAAGGTGGCCCTC
 TGCTCCGAGCTTCTCTTCCCGAGCCAGGCCAACTCTGCTTCTCAGAGACCTTGGGTGGGGTGCATAGGAAGAGAGGGT
 GCCTGGAGCCCTAGGATGGCATAGAGGAAAAAGGAGAGAGTGGGCTGTAGTCTGTGAACTGGAAGAGAGCACTTCTGGGGC
 75 AGTACCAGTAGGTTAGATGGTGGTAACAGTAGCCTCTGTGTGTAGTAATGTCCAGGAATATCTAGGTAAGGTCCCATCCGACAAG

268

269

270

271

272

CGTAGCAGAAGGTGTGAAGCTGGGCATCCAGGAGTGCCAGCATCAGTTCCGGGGCCGCCGGTGGAACTGTACCACCATAGATGACA
 GCCTGGCCATCTTTGGGCCCTGTCTTGGACAAAGGTACTTGCTGAGACTCGGTGGGAGGTGGCTGGGAGACTGGGGGTGGTGGGAA
 GGGTTCTGGGGACCTGTCCCTTCTCCCACTGTGGGAAACCTGAGTCCAAGTTCTCCCTAGGAGGGTAATAAGCTGGTGGAA
 AGTGGGTGGGTCCATCTCTGGACAGGACAGGCTGTGTCCACATCGGCTACATCTTTCTAGTGCTACAGGGGGTGGGTAGCCCT
 5 GAGGTGCCCCAGTGTCTGAGATTGGAGGGCAGGCACCAAGAGCCCGAGCCCTCTCTCCGGATGACACAGTGGGGGCCAGTC
 TTTGATGTAGACATGTGTGACATTTCCCTTATGCTGTGTTAAGTGCTATGCAAAATACAGCTTGGGGGTGGGGTGGGATGGTGCCA
 GGCTAGGTGTTGTGCCATGGAAAAAGTCTCTATGCTCTGTCAAAGCTGTCTGGTGCTGGTAGCACTACATGACCCCGAGGGTCC
 CCTGAGAGTTCTGTGTTGGTCCCATAGCCTGAAAGCAAGACGCGTCCATTAAACCTGATGTCTGTGGATCAGCTCGGTGATCTG
 GAAGTCTGACAGCTGTGACCCCTAGTGGATGAAAGCCGGCTTTTGACTTTGCACATGGGGCATAGGAGAGGGTTGAATGGGGTAAC
 10 TGCTCTTAAGAAGGGGACTTTGGCTCTAGAACCTCTCTGTCCAGGAATTTAACGGCTTAGCTGGGCTGGCCTCGACTGGAGTTT
 TGCCAGCCGATGGGGCGAGCCTGCTCTGAGAAGGTTCTGTAAGCTGCATTACAGCCAAAAGGAGGAGTCCGAGAGCTAGCGG
 GAGGTGGGCGCAGAGTTTGGGAGAGGGGAGCTATCCCCCTCTTTGGAGAAAGCCCTCTCCCCCTTACCTGTGCTTCAAGTGC
 AAAGTGTCTGTACAACCTACAGGCAGAAAACGACAGGCTATTGTCTGGGACAGGAGGCAATTAGCAAATCAATGGATGATGATT
 TGTTTACGCTTCTAATACCAAAGCTAATTATTCTTGTGTTACATAAAAGGTTTGGCCTCTAATTGGGGCCAAGTGGCGCGCGCG
 15 TGGCTTTTCAAACTGATCTCGCCCGCTGTGTGTCTCACGCGCTTCCGGCGCCCACTCAGTCCAGGTAGCGTTTAACTCAAAT
 GCCAGGCGTCCGACGCTCCCCCAAAGCAACACTGGCCTTCTGATCACTCTCCACCCAGGATAGTGTCCATCGAGACTTTCA
 CGATGATACCCGCTCGCAGTGGGTCTGATGTTTAGATTGCGAGCAGTGGGTTGTGCCACATGCCTCCGCTCCACAGCAAGAGGGCA
 GTTTGTGTCCAGTGTGCAAGGAAATATGGGGCTGAGACAGTGGGATTTGATGAAGCAGTGGGGTGGGTTCCAGGAAGATGTAC
 CGCGCTCCCGGTACCTGTGGGACAGGCGGTGGGTCTGGCCACTTTTGGCAGCTCTAGCAGTGGGGTGGGCGCGCGGAAGG
 20 CGCAAGGCGCGGCTCTCCGCGCTCCGAGGGTTGAGCGCGCGCCCGCCCGCGCGCGCGCGCTGCGGTCCGCGCAATTACAC
 GCCCTCTGGCGCGCGCTCCCGGGATCGCGCTGCCGCGCGCGGGCTGGGGCGNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
 NNN
 NNN
 NNN
 25 GGGTCCGCGGAAGCCAGGGCGCCCTCCCTGGGGCGAGAGGGCCGGGAGGCTGGATCACCGCGTGCAGTCCCCCGCGCTT
 GGCTGGAGTGTGAGCGAGCTCTCGCTCCGCGCTCCCCCGGGCTGGCGGAAAAGTGGGACGCGCCCTGTGTGAGGTGGCGG
 ACGAGGGCTTCGTCTGCAAGGCTGTGTGGCTAGTGAATCTGGTTCCTGCATATTACAGACGGGCGAGCACTAGGAAAG
 GAGATCCCGCTCTGACCACTGTGCGATATAGCAGCCGCTCTGGGAACCTATAAAAAGAGATGGCCGGGCGGTGGCCTCGC
 CCGGCCCTGTCTGTAATAAGGGTTAGAACATTGTAGGGAATAAAGCAGGAAAGACAGATCTGCGCTATGCACTAGTACAGG
 AGTGGCTCTCATTTGAACAGGCTGGTGTATGCCCGCTGAGACTCTCATCTGAAACCTGGGCTGAGGCGGAGAACTGCTTGT
 30 CTCGACCCCTGTGGCTTCGTAGGAGGAGGGCAAGAAATGGGCGAGCCATGGCTGAAGATGTGCACCTACTTTACAGAGTGTACTGT
 GAGGCACAGATGAGAAATCTGCCTACGGGGAATGAGGTTGAGTGGAAACGAGTGGATTAGTAGGTTTTAGGCTGCGAGTTCCAGT
 CCAACCTAACTCTTCAGAGAGCATTCGGTCCACCATAGACCTCCCTTCTTAGTAGCCCTGCAGCTCTGAACTCAGCTTGCCCA
 TCCACAAAGAGAATACTAAGTGGTCTGAATCTTTAGAGCAACAGGAGGGCACTGGCTCTCTCCCCCAATGACTGGTAGGCC
 35 TTTGGCTCTTCCCCAGCCCTCAGGGCAAGGCTGTATGTATACCTAAGGCTCCAGGCTGAACATCTTCTCACACCTCCCTCTGC
 AGCCACCCGTGAATCGGCCTTCGTGCATGCCATCGCTCGGCTGGTGTGCGCTTCGAGTGCACGCTCTCCGCTGAGGGCAACCT
 CCACCATCTGCGGCTGTGACTCACAATCAAGGGGCCACTGGAGAGGCTGGAAGTGGGGCGGTGAGCGAGGACGCGGACTTC
 GGGGTGCTGGTGTCCCGGAATTTGGCGATGCGCGGAGAACAGGCGAGATGCCCGCTCAGCTATGAACAAGCACAACATGAAGC
 40 AGGCGCAACGCTGAGACAGCGAACCAACTCGGGGCGGGAGGCACTCCCTGGACCCCTGCTTACGCGCAGGTTCCCATCCAC
 ACCCCATAGTAACCCCTGACCACCTCTCTCTCTCCAGCTGTCTTTGAATAGGTTTAAAGTATATTTACTCATTTCTC
 AGTGTGTGTATTCATGTTGTGTATGTGGAAGTCAGAAGGCAACCTGTAGTGGTCAGTTCTTCCACCATGTAGGTTTCCAACT
 GAATCATGCTTGTGCTGTTCTGGATCTTTTGAAGATCTGCCAAGGATGCGATATGGCTGCCCATAGGAACACACCCATAG
 45 GCTACACTGGTTGGCAGGCTGTGCTGTGTAGCTGTGTATGTGGTGTGGGTGGGGAGTGAAGTCTGAATCCAAAGTAGGGTTT
 CATAGCATAGCCCTTCTATGCTCGTGAACACTTAGCTCTCGGCTCAGTTTTCATCTGTTCAATGGGAATAACAGTCCCTGAT
 TTGACCACTTCTATGGATGAGGTGAATGTGAAGCTGCTGGGCGGGGTGTGACTAGGGAACATGTTTCCACCATCTTCT
 TTGGCACCAAGTAGAGTAGAGGAGGTGTGTACAGAGGGAAGCTTCTCCGGTGTGTGAGTCTGAACTAGCTGTGCCCCCTC
 TTTCCCTAGACCATCTCTGACACATGCACTAAAGTGTAAATGCCACGGGTGTCCGGCAGCTGCGAGGTGAAGACCTGTGGT
 50 GGCCAGCCGACTTCCGTGCCATGGCGACTTCTCAAGGACAAGTACGACAGTGCCTCCGAGATGGTGGGAGAACACCGTG
 AGTCCCGAGGCTGGGTGGAGACCTCGGGCTAAGTACGCGCTTCAAGCCACCCAGGAGAGGACCTGGTCTACTACGAGAAC
 TCCCCAACTTTTGTAGCCCAACCCAGAGAGGGGCTCTTTGGTACCAGGACCGGACTTGAATGTCACTCCACGCGCATCGA
 TGCTGCGATCTGTGTGCTGTGGCGGGGCCACAACAGGAGGAGGAGAAACGGAAGGAGAAATGCCATTGCGTCTTCCATGGT
 55 GCTGTATGTGCTGAGTGCAGAGTGTATTTCGATCTACGATCTGCAACCTGCAAGTAGTGAGCCAGGTAGGCGCGGGGAGC
 GTGGGACTGCCCTCTCTCCATCCGCTAGGCTGTCTTCTGATTCTCGGCTTCCCAAGACGAACAAGTTCACCAAGCTGAAGTC
 AGAACTAGGCTTCCACGCTTCCACGGGAATGGTCTTGGGAGGAGCTTGAAGTATTTACAGAGGCTCAGATAATGACTGAGG
 TGTCACGCTGAGCCACAAGCAATTGATTAAATTTTACAAATTAGCAGTGTAGGCCAGACAGATTGTTTCTATGGCTGTGG
 60 CTGTCTATTAGTACGATCTATTCCGCGAGAAGAGGTTGAGTGTGTTCCAGCCATGCCCTAAAAGTGTCTATCTCAGGGCC
 TCAGTTTCCCTACTGTCTAAAGGAGAGGTTCAAATGTGAGAAACAGGGGAGGGTATGGTGGGACTGGCCTTAATCCAGCACT
 AGGAGGCTGAGCATCTGGATCTGAGTGTGAGGTCTGGCTGGTCTCCATAGAGAGTTTAGGCCAGGACTACACAGTGAACCCCTG
 AGACAGTCACTAGTAAGTCTCTCTAACCCTGGGGCAGAGTCATTTACATCACCCATGAAGTGAAGGGCAAGCTTTGACCTAA
 65 CACAAATCTCCAGAGCTTGGGAAGGTGGGTGGGGGAAGCCAGATCTGAAGCTTGGGTGGAGCGGGAGCACTCTACCAAGTTTAT
 GGAGGAGAGGAGAAAGAGGAGCTCCAGTTCCAGAGCGCTGGGGTGAAGTGAAGCTGGGATAAAAGCTGGTGGATTATGCTTC
 CAAGCTTCCAGAGGTGGCTGCATGCGTGGGAGGACCCCAAGAAAGGTGAGCTGGAAGCAGAGTGATCTAGAGGCTCTGGCAT
 GGGCCAGTGTGACCTTGTCTGTCTCTCCCTCCCTGAGAGGGCTCTGCTAGTGAAGTCTGACTCTCAACTGGCTTTCTTATTGTC
 70 AACCACAACTCTGGCTTCAGCATCTGTTACCTTCCCCGAGCAGCTGTGAGGAACGTGGGAAACCATTTGGTCTCTGGAAAGCA
 GCTTTCTGTCCATCTATGGATGGCCAGCGCAGTGTGTTCCACCCAGGACCTTGGAGCTGGTGACACACAGAGCTGGTGGCTCAT
 GTCTGCGCTCTGTAAGGTTGGGGGTACCTGACATCACAAGCCCATTAAGAAGTTCTTGTGGGGCTTAGGTTCCATTCCAGG
 GTCCCTCTAGAACCATACAGGAGGCGTGGGTTTCTTTATCAAGTCAAGGCTGGAAGGAAGACAGCGCGAGCTTTAGCGCTTCA
 CGCGCTGCTGTAACCTCGCTCTCTCTGCGCAGTGTGATGGGATCTTGTAGGATTTTATAAGGCTCAAGTTAGT
 75 GGGTGTGAATGCTGTCTAAGTGTGAGGTTGCCATCAGGCTTAGCAGGGGTGTGTCGAAAGGAAGATCCATGGGCGTTCTTTC
 TGCTTTTCAAGGGATGGGAGAAAGTACGAGTAGGAGGTTGAGGTGGAAGGAAGCAGACCATGACGGCGCCTTCTCTGGTA
 TTCACTCTGCAAGAGTTAGCCCTGACCCCAATATCAGATAGTACATACATAGCTCTGGCCGTTTGGAGGAGCTCTTGGTGTG
 GCTTCTTATCACTCAGTAGAAGGGCAATTGTCTGACCACCATGTCTGAGGTTAGACTTGAGTTAATGGCTAGATAGAC
 CCAGGGGTCTGCTTCCAGAGCTTCTATGTAGAGCTTGCATAGGCTCAGATTGCCAACCAAGCTTGATACATGGGGCAGTGTG
 GGTCCAAGATACAGAGCCATGACTCACTCCGCTTGTGCCATGTGGGAGCTGAGATCTTCCAGGCAAGGAGGAGGTGACGG
 TGAGCCTTTGTTGTCAGCAATCGCTCCACTCCAATCTTGCTTAAATGATCTCTAAGAAGAAATGGGTGTAGCTGGGTAGT

274

275

TTGGCGTCTGCTCTGTGGAGCCACGGCAACTCTGAAGTTGTGGAGCCTTTAGGCAGCCTCCCGACTCGACCACACCGAATAA
CTTACATCACCTTTTCCATCAGATCCCATCTAGTCATCTGTGCACATTAAATATTAATCAACACTCACTCGAAGACTCACTTTTTTT
AATTAAGGCTTTATCATCTTCAAAAAAAAAAAAAAAAAAGGAAACATTCCACATTATAAAGTTGTGAGGTTTGGGTAGCGT
TCTTTCTTTTTCTTTTGGTAGTTCCAAAGG

5

MOUSE SEQUENCE - mRNA

CCTCTTCATGATCGCCGGCAAACCTCTCTCGCGCTGCTTCTAATGGAGCCCCACCTGCTCGGGCTGCTACTCGGCCTCTGCT
CAGTGGCACCAGGCTCTCTGCTGCTACCCAAATTTGGTGGTCCCTGGCCCTGGGCCAGCAGTACACATCTCTGGCTCCAGCCTC
TGCTCTGCGGCTCCATCCAGGCTGCTGCCCAAGCAACTGCGCTTCTGCCCAATTACATCGAGATCATGCCAGCGTAGCAGAA
10 GGTGTGAAGCTGGGCATCCAGGAGTGCCAGCATCAGTTCCGGGGCCGCGGTGGAACGTACACCATAGATGACAGCCTGGCCAT
CTTTGGGCTGTCTTGGACAAAGCCACCGTGAATCGGCCCTCGTGCATGCCATCGCTCGGCTGGTGTGCGCTTCGCTGACAC
GCTCCTGCGCTGAGGAACTCCACCATCTGCGGCTGTGACTCAGATCATAAGGGGCCCTGGAGAAGGTGGAAGTGGGGCGGC
TGACGCGAGGACGCCGACTTGGGGTGTGTTGTCCCGGAATTTGCGGATGCGCGGGAGAACAGGCCAGATGCCGCTCAGCTAT
GAACAAGCACAAATGAAGCAGGCCGAACGACCATCTGGACCACATGCACCTAAAGTGTAAATGCCACGGGTGTCCGGCAGCT
15 GCGAGGTGAAGACTGCTGTTGGGCCAGCCGACTTCCGTGCCATTGGCGACTTCTCAAGGACAAGTACGACAGTGCTCCGAG
ATGGTGGTGGAGAAACCCGTGAGTCCGAGGCTGGGTGGAGACCTGCGGGTAAGTACGCGCTCTTCAAGCCACCCAGCGAGAG
GGACCTGGTCTACACGAGAACTCCCAACTTTTGTGAGCCCAACCCAGAGACGGGCTCCTTTGGTACCAGGACCGGACTTGCA
ATGTACCTCCACGGCATCGATGGCTGCGATCTGCTGTGCTGTGGCCGGGGCCACAACACGAGGACGGAGAAACGGAAGGAGAAA
TGCCATTGCGTCTTCCACTGGTGTGCTATGTGAGTGCACAGAGTGTATTGCGATCTACGATGTGCACACTGCAAGTAGTGAGC
20 CAGGGCACTGGGAAGGGGTAGATTGTGCGGCTGGATCCATTCAATCGAAGTCCCATGAGAAGCAGGATCTAGATCCAGGCCAGCTT
CGGCATGCGCCAGCAAGGAGCATGGATGTTGCCAGCTGCATGTGATAACGACCTGGACCCAGCCGGCTCGGACGGACGGGCGG
CTTCTTTCTCAAGTAACGCTCTCTCCCTGCTCTGGATGGTGTACGGCTTTACAGAGGGGCTTTCTTTATGGTTTACCAGGGTCT
CTGGGGACAGACTCGAGGCTTACCTTTGACATGTTAAAGAAAAATAAAAAATGAAAAAATAATCTACCGCAACAGAACAGGCTG
25 GGCTAGTGTGAGCTCTTGGCTGGTGGGAAGGACAAAGACCATGGCGAGATTCTGTGTCCAAGCTGCTCTACTCGTACATTCCAA
GATGCTCTGAGGTGGAACTGTGAAGTAGGACAGAGCCCCGAGTCCCTCTGTGCTCGACTCCCATTTAAATTTGGACATACC
TTGTCTGTGAGAAAGCCATAGATAGGTGTAGTGTGGATGTAGTATGGGAGGCCCTGGCCCAAGTGTGGGACAGATCTTG
AGTTTGAAGACCTCAGAGTCTGGGCGGCTGGGAAGCCATCTGCAGAACAGAGTTCCTGTGGGCTCCTGTTTTCGCTAGCCCT
GTCTGCGCTGGAGCGACAGTCAGATCTCCACGCCCTTTCTGTGTTTACAGTGTCCACCTTTACTACGGCTTTTTTTTTTTTT
TTTCATGATGACCTTTGAATAGGTGAGATGGGAGGAGGCTCTCTTCTGGCTCCATCCACCACCCAGAAAGATGGGCTGCTC
30 TGCCCTTCTCAGCCTTGCTAACAGCAGACCCGAGGAGAGCAGCGGGGACCTTAGAGAGCAATCTAAACATGTTGGCAGGTGG
GGAGGGTAAAGAGTCCCACTTCTTTGTGTTAGAAGGACAGTACCTGCGTCTTTTCTCCATTTGGCTGAAGTAACAGAAAGA
CAAGAGATCTTAACAAGCCCTTCTCCCACTTTGTAAGGGATAGCTCTCTCAGTTCCCAAGGATCTGGATTAGATAGATATTC
AAAAGAGGCAAGCAGCAATGGAGGACGCTCCAGCTCTGTTCCCGACGATGATGGTACTGGCTGGGTTAGTAAGGTGGGTGGG
GCTGCAGGATCAATCCATCAACTCCGTCTTAAGGAGAATCAGAAAGAGGAGATAAAATGGGGGAATGGGGCAGAACAAAGATTT
35 GTCCTTTCCGCTCTGTCTAGGGTCTGCTAATGCTGGCTGACGAGGGTCAAGCACTTTCTTCTGTGTCAGTTGGCTTGGC
AAGCAGGCTCAGTAGGCGCTTGCCTGCACTCTTACCATGTGACCATGAGCACTGCTCTAGGGACCTCCCATCCCTTCTAGC
ACCCAAATGCCCTTCCCATCTCTCTTCCAGAGTGGAAATCAAGTCAACTGGATAACGCTTGTGTGAGACACTTGAGCAGAA
CGGATACAACATTTACAAGTCTCTCATATCTATGATTCTATATTAAGAGTATAAGTCAATGTTTCCGGGCGTATTCAAGTA
40 CTGACAAGTAATTTATTAATAGTACATGAGCGCATGTGTAATATCTCGCCATAGTCAGGTAATAGCATCCATGGGAGGTC
CTACCAACCTGCTGTATCCAAAGTTTGTAAAAAGTTGTAGAAGTTGTGATCTTTTGATTTTATATTCAAAAAGTCTCTTTT
ATAAATATTATTATTATACAATGTATATACCTTTGAGTTAACTAAGATTATATATTATATAATATATATATT

MOUSE SEQUENCE - CODING

ATGGAGCCCCACCTGCTCGGGCTGCTACTCGGCCTCTGCTCAGTGGCACCAGGCTCCTGCTGGCTACCCAAATTTGGTGGTCCCT
45 AGCCCTGGGGCAGCAGTACACATCTTGGCTCCAGCCTCTGCTCTGCGGCTCCATCCAGGCCCTGGTCCCAAGCAACTGCGCT
TCTGCGCAATTACATCGAGATCATGCCAGCGTAGCAGAAGGTGTGAAGCTGGGCATCCAGGAGTGCAGCATCAGTTCCGGGGC
CGCCGCTGGAAGTGTACACCATAGATGACAGCCTGGCCATCTTGGGCTGTCTTGGACAAAGCCACCGTGAATCGGCTTGT
GCATCGCATCGCTCGGCTGGTGTGCGCTTGCAGTCACACGCTCCTGCGCTGAGGGAACTCCACATCTCGCGCTTCCGCTGAC
ATCATAGGGGGCCACTGGAGAAGGCTGGAAGTGGGGCGGCTGCAGCGAGGACGCCACTTCCGGGTGCTGGTGTCCCGGAATTT
50 GCGGATGCGCGGAGAACAGGCCAGATGCGCCCTCAGCTATGAACAAGCAACAATGAAGCAGGCCGACACCATCTCTGGACCA
CATGCACCTAAGTGTAAATGCCACGGTGTGTCGGCAGCTGCGAGGTGAAGACCTGCTGTTGGGCCACGCCGACTTCCGTGCCA
TTGGCGACTTCTCAAGGACAAGTACGACAGTGCCCTCGAGATGTGGTGGAGAAACACCGTGAGTCCCGAGGCTGGGTGGAGACC
CTGCGGGCTAAGTACGCGCTCTTCAAGCCACCCACGAGAGGGACCTGGTCTACTACGAGAACTCCCCAACTTTGTGAGCCCAA
CCGAGAGACGGGCTCCTTTGTACCAGGAGCCGACTTGAATGTACCTCCACGGCATCGATGGCTGCGATCTGCTGTGCTGTG
55 GCGGGGCCAACACAGGAGCGGAGAAACGGAAGGAAATGCCATTGCGTCTTCCACTGGTGTGCTATGTGACGTGCCAAGAG
TGTATTGCTATCAGATGTGCACACTGCAAGTAG

HUMAN SEQUENCE - GENOMIC

TGCTGCTTGGCCTCCCAAGTGTGGAATACAGGCATGAGCCACCGTCCCGACCTGGGCAGAACTACATTCTGGATGCATCT
60 TAAACCTCACCTCAACCTACACCTCCCTTTTGTGTTTCTTTCTCCCAAGTCACTCAGAAATGAGGCTCCAGCTCCAGG
CTCCAGTGTGAACCTCACCCCACTAGACAAACCTCAAAATCAAGAAAAAGAGCCCTGGCAGGGCGTGGTCACTATGCTGTA
ATCCAGCACTGTGGAGGCTGAGGTGGATGCTGCTGAGCTCAGGAGTTCAAGACCACCTGGCTGGGCAACATGATGGAACC
CCATCTCTACAAAAAATTTAAAAAATTAGCTTGTGTTGGTGTGATGCTGTAGTCCAGCTCCTGGGAAGCTGAGGTGAGAG
65 GATCATTAGATCTGGGAGATGAGGTGCGACTGAGCCAAAAATTTGTGCTGCTGCACTCCAGTCTGAGTGACAGAGTGACGCTGT
CTCAAAAAAGAGAAAAAGAAATCCAAAGGAAAAAGAGAGAGACAGAGAGAAAGGAAAAAGAGAAAAAGAAATTTT
TGTTGGCCAGGCCGCTGCTCATACCTGTAATTCAGCACTTTGGGATAGGCCGAGGTGGGCGGATCATGAGGTGCGCGGATCAT
GAGGTGACGGGATCGAGACCATCTGGCTAACATGGTGAACCCGCTCTCTACTAAAAATAAAAAAATCAGCTGGGCGTGGTG
70 TGGGTGCTGTAGTCCAGCTACTTGGGAGGCTGAGGCGAGGATGTTGTGAACCTGGGGCGCGGAGCTTGCAGTGAGCCGAGAT
TGCACTGCTGCACTCCAGCCTGGGAGACAGAGCAAGACTCTGCTCAAAAAAAGAAAGAAATTTCTGCTCAAAAAAAG
AGAAAGAAAAAGAAAAAGAAATCTTAACACTCATCATCTTAAGTAAAGCAACTCACCTTGAAGTCAGTCTCCACATTAACT
CAACTACCTACATAGACATGATGGGTGAGGAGGATACAGATAGTTAGGAGGCTTTGGCTACAAGTAACGACTCAAGTGGCT
AACGAACAAGGAAATGTATTATTTATATCACAAGAAGTTCCAAAGCAGGACTCCTCTGAAGGCACTTAGTGTCTCAGCAATGGT
80 GTCAGAGATGAGTGTGTTCTCTCTTGGCTGTCTTCTGCTGCGGCTCAGCTTCTTCTCAGGACGCTTCTCTCATAGTCAC
AGTAATGGCTGCTGAGCTCAGGTATCCCAACCAACCAACATGTCCAAAGCAGGGAAGAAATATTCTTACTGTGTGCTCAT
TTAAGAGCCCAAAACTCTTCCAGAAACCTTCTGACCCCTCAGCTGACCTCCCTCAGGCACATGTACCCAGTTTAGGCCAA

277

[illegible]

CAGCTTTATTCTCCCGAGGAGCCAGCATGCTTTCTCTTTCTGATAAAGCATGCTTCCCTTTATGTCTGGCTATGAGAAAACT
 CAGAGGTCCACCTGAAGCCACATCCTTGACCCCGTGTGGACCTTCCCTGATCCTGCTCTTCCGTTTTATTGTATTGAATCTG
 ATGTGTTTTCCGTCATCAGCCTCTTGAGGGCAGACATGTTGGAGTCTTTGTACTGGCCTGGGCATAATGGATCCTCAATAAAGAC
 TTGCTTTTGGGATACACATTGCTGTCAACCTCTTCAAATCCTTTCTGGAAAGAACCAAGGCACATGCGAATTAAAAAGCAAAATA
 AACATTGCTCTGGGAGGAGTTGGTCTGACTGGATAGTTTGTAGTTATGAGAATTCAGATCTGCTTCTGTTCTTTTTTCTGT
 5 TTAATTTATTACTTAGAGATGGAGTTTGTCTTTGTTGCCAGGCTGGAGTGCAGTAGCATGATCTCGGCTCACTGCAACCTCCG
 CTCCCGGTTCAAGCAATTCCTGCTCAGCCTCCCAAGTACCTGGGATTATAGGCATGCGCCACCACACCAGCTAATTTTGT
 TTTTCAGTAGAGATAGGATTTACCATGTTGGTCAGGCTGGTATCAAATCCTGACATCAAGTGATCCACCTGCGCTCGGCCCTCCA
 AAGTCTGAGATGACAGGCGTAAGCCACCAGGCCCGGCTTCTTCTGTTTCTTACTGTGAGCTTTTCCCAAGTCTACAAAGGT
 10 CTGTCTTCAGAGAAGTCGCTCTTTTTTTCTCCTCATGATCTTCTCCACTCTAAAGCTGAGGTTGGTCTCTAATCTTCTCTTAGG
 GACTGTCTCTCGTTCTGGCCATGACTATGTCCACCCTACCCCTGGCTCCCTTCACACTGGTCTCTCCACCCTCCCTTGCT
 TGGAAAGCCGAGCGTCTATTGCCACCATTCACAGGTGACGGAGTGCCAGGTAGCACCCACCCTCTCTCAACAGAGCTGCTCCC
 GTCCCGAGCAGCATCGTGAGGGCCAAGCCCACTTCAACCTCTAACCGGCTCTCCCTCCCTCCGCTTCTGCTTGGGCAACATGTGCAGG
 15 TTTGCTTCAACCCAGCAAGGTGCTTCACACTCTAACCGGCTCTCCCTCCCTCCGCTTCTGCTTGGGCAACATGTGCAGG
 TCACCCACCAGTCCCTGACTTCGGAGGAGAGATGTCTAGCCTCAGGCTGGGTGGTCTCCATCTTAAGTGAAGCTTCCATAGG
 GGATCTGGAGCCTTTCTGCTACCAAGTGAAGTGTGTGACCTCTGCACTGTCTGGAAGCTAAAGCAGCTTCAAGAAAG
 CAGCCTCTTATCCCCATGTTACCTGTGAGAAAACTGAGGCTCAGCTGGGCGGGTGGCTCAGGCTGTAAACCCGGCCTTTGGG
 GGACAAAGGCAGGAGATCAGCTGAGGTTGGGAGTTTGGGCGAGCTGACCAACATGGATAAACCCCACTCTACTAAAAATACA
 20 AATATTAGCCGGGCTGGTGGCAGTGCCTGTAATCCAGCTACTGGGAGGCTGAGAAAGGAGAACTCGCTTCAACGAGGGCTGAA
 GTTGGCTGAGCTGAGACCTGGCCATTCACCTCCAGCTGGGCAATAAAGCGAAACTCTGTCTCAAAAAAAGAAAAAAG
 GAAAGAAAAAGAAAAAGAAAAAGAAAAAGAAACCGAGGATCAGAGGCCCAACAGGAGCTGTAAAGAGCTCGGAAGCAAGTGGGCG
 GCTCCAGTGGCAGTAGTAATTTCTCGCTTATGATGTCCCGGTATCACATACATTGAGGAAACAAAGCACACATTAGCTCATC
 25 GTCCCGACACCCAGGAGGAGAGACTCTGTTATCCCCATCTACAGATGAGAACTGAGGCCCTGAGGCCACTTCCGCTGCTC
 GAAGGCTCCATGTTTGGTAAACCCAGAGCTCTAAACAAGAGACAACTGCTGAAGCCAGGCCCTTCAAGTACACACACACAC
 CACAGCCAGGAGGTTCTCTTAGATCTGACTTCACTTCTTCTAATCCAGGCCAGGTTTCTTCTGCGGATGTGAATATCAC
 GTCAAGTTTCAGTTTGGTTTGGTGTGAGACAGGATCTTCTGCTGCTCAGCCTCTCAGTAGCTGGGATTATAGGCGCCGACACAC
 30 TAGCCTCAATCTCCTGGGTGAAGCTATCCTCTGCTTAGATTGCCAAATCACTAAGACTACAGGCAAGCACCATATGTGGCTAA
 TTTTTTAATTTTTATTTTTTATTTTTTTGTAGACAGAGTTTTCACCTCTGTGACCCAGGCTGACGTGCAATGTGAAGATCTTGG
 TCACTGCAACCTCCACCTCCCGGTTCAAGCGATTCTCTGCTCAGCCTCTCAGTAGCTGGGATTATAGGCGCCGACACAC
 CTCGGCTAATTTTTGTATTTTTAGTAGAGTGGGATTTACCATGTTGGCCAGGCTGGTCTCAAACCTCTGACCTCAGGTGACCCG
 35 CCCACCTCAACCTCCCAAAATGCTGGGATTACAGGCGTGAAGCACTGTGCCAGCCCTTTTTCTTTTTTTGTAGAGATAGCATC
 TCCCTACATTACTCTGCTTGAAGTGGACTCAAAACCTCTCTGCTCAGCCTCTCAAAGTGTGGGATTCAGGGGTAGGGTTC
 CAGTTTCCACTTGAGGACAGGCTTCGCTCATCCCTGAATCTTCTGTCTGGAGTTGGTCTCTCCAGTGGGTTCGTGGTCTC
 ACTGACTTCAAGATGAAGCCAGTACCTTTGCGGTGAGTGTACAGGTCTTAAGGACCCCAAGAGTGAGCAACAGCAAGGATTAT
 40 CCTGAAGAGCAAAAGAACAAAGTTTCCACAGCATGGAAGGCGACCAAGGGGTTGGTGTCTGCTGGCTTGGGGTGGGGGTTGGG
 CGGGGAGGCGAGCTTTATTCCTCATTTGTCCAGCCATGCTCTGTGATTTGGTCCATTTTACAGAGTGTGGTCCATTTT
 ACAACCTCTAGCTAGCTACAGAGCACTGATTGGTGCAATCTTACAGAGCACTGATTGGTGCAATTTACAAACCTCTTGAAGACA
 GAAAGTTCTCCAGTCCCGAGTTGACCCAGGAAGTCCGGCTGGCCTCATCTCTCATTTCTCTAGAACAAATCTCCCGAGGTG
 45 ACCCTCTCTTACTCACCTTTAACTACTTGTCTTCTCTTCTGATCTCTTACCAGCTTTTCTACAACCTCTCTGCAAGTCTCTAG
 CCACAGAATTGCTTTAAATCAGGAAAGAGGGGCTGCCATCAGCTCTCTGATTAGAGGCTTCCGCTCTGTGTCTTACAGCAC
 TTCCCTTCCCATAGGGCAGGAGTCTGGAATCCAGCATGCTGCCCTCAAGAGGCTTATGACGGAACACATCAGTTAAATA
 CAAATTAAGAACAGGCTAGTTGTGGTGGCTTGCCTGTAGTCTCCAGCACTTTGGGAGGCCAGGCGAGGCAGATCAGTTAGGTCA
 50 GGAGTTCGAACAGCCTGGCCAAACATGCTGAACCCCGTCTCTACTAAAAATACAAAAATTAGCCGGGTGGTGGCCACGCACTG
 TAGTCCAGCTGCTGGGAGGCTGAGGCAAGGAAATCGCTTGAACCCAGGAGGTTGGTGGTGCAGTGAGCCAGATCACACCACTG
 CACTCCAGCCTGGGCAACAGAGTGAAGTCTGTCTCAAAAAATAAATAAACAACAGAGAGCAGGATCAAGGTCAAGG
 AGAAGACAAATATGCAAGTCAAGGTCAAGTGAAGTGAAGTGAAGTGGCTGCTCAGAGCCAGGACATAAGGGAAA
 55 ACAGCTTTACTGAAAGAGAGAGGATGCTGGGTCTCAGGAGAAATGCCCGCTACAGCCTGTGCCACCTCTTCAAGTGGC
 CCATGAGAATTTAGGCTCTGGAGTATCTGGCCAGACAGCCTGCTCAGGCTCTCGAGGCTCTGCGGCTCTGAGGCTTGGGCTG
 TCTGCCAGGCGAGGCACACTGCTGTGGCCAGGCTGGTCAAGGAAATTCATTTGCAAGGGCTGTGGCTGGAGCTTGGGGTG
 60 TGGCTGGGCTCTCAGCATGGGATGAGAGGAGTGGGCAAGCTGACAGGCTGGGGCTAGATCTCCCATGTCAACATTGTCTAGCG
 TGAATCTTATCAGGTAACCTAGCCCTCTAGGTGGCAAGTAAAGTTTTTGCAGATAGGAGGATAGAATGATTTTAACTTTTT
 TTTTCTTCTTGAGACATAGTCTTGCACTGTGCTCTCTCTCTCTGATCTCTTACCAGCTTTTCTACAACCTCTCTGCAAGTCTCTG
 CAAGCGATTCTCTCCCTGAGCCTTGGCAGTAGCTGGGATCATAGGTGTGCACCGCCACACCTGGCTAAGTTTGTATTTTAGTA
 65 GAGACAGGTTTTGCCATGTTGGCAAGGCTGGTCTCAAATCTCTGAGCTCAGGTGATCTGCTGTCTGGGCTCCGAAAGTGTCTG
 GATTACAGGTGTGAGCCGCTACGCTGGCCAAAGTGAATTAATTTTAAAGTAAAGTACAGGAAAGACGTAACCTGCTTTCTCTG
 CTTTACCCTGCAATAATTGGTACAGAAGACTTCTGTGACCAATGCGTGATACACCAAGCAAGCTGTCAATTTCTGCGGCAGACA
 TCAGCCAGCCTCTCTAATCCAATTCAATTTCTGATGATCTCCACCTGGACATAGCATCTGATCCCATAGGTTGAGGTCTTAGTTCC
 70 CAGGACAGCTCCCTTCCAGTAGCAATCCCAAGCCCAAGGCTGCTTACATGTGCTCCTGACTGACCTGCTATAAATCAGGTT
 CCTGTGACTTCTCTTGGGTTCCATTAATTTGTAGAGTGGCTCGCAGAACACAGGAACACAGCTTACTGGTTTATTATAAAGG
 ATATTACAGGATACAGATGAAGAGGTGCATAGGCGAGGTATGGGAGAGCTGCACTGAGCTTCCACGCCCTTCCAGGCACACC
 75 ACCTTCCAGGAACCTCCAGTGTTCGCTATCCGGAAGCACTTGAACCTGTCTTTTGGGCTTGTATGGGGCTTCAATCCATG
 GTATCTGATTAAACCTTGGCCACTAGTGATCAACTTAATCTTACGCCCCCTCTCCCTTCCCAAGGATGGGTTGGGGTTAG
 GGTGGGAGTCCAAACCTCTAATCTTGGCCGGGACAGGTGGCTCACACCTGAATCCAGCACTTTGGGAGGCCAGGCGAGGTGGA
 TCATCTGAGGTGAGGTTCCAGACAGCCTGACCAACATGGTGAACCCCATCTCTACTAAAAATACAAAAAATTAGCCGAGCA
 80 TGTTGGCAGGTGCTGTAATCCAGTTACTGGGAGGCTGAGGAGGAGAACTCGCTTGAACCCAGGAGGCGGAGGTGCAAGTGAAG
 TGAGATCACAACTGCACTCCAGCCAGGAGAGAGAGTCAAACCTCGTCAAAATAAATAAAGAAAAAGAAAGTCCAAACCT
 TTAATCTGCTGGGCTTTTGGGTAACCAACCTCAATCTTGAAGCTGCTAGGGGCTGCCAGCTCTTCCGTCAGCTCATTAGCA
 TACAAAAAGAGCATCACTTTGAGTTTCAAGGATTTAGGAGTTGTACGCTGGGAACTAGGTGGAAGCAAAATATATATTTTAT
 85 AATATCACAAACATGCGTACAGGCGAGCACAACTTGTGAGTGTACAGCTTAATGAGCTGGATAGAATATCTTATGTTTAAACAGT
 TTGTGAACCTGCGATGAACTTTTCAATACTGGGCACATGGTAGAGGCTTCTGTGAGTGGTCTCAATGCTACAGCCAGGCTT
 AGGCTTTGGCGGGAACAGTTCCACTAGGTGCAAGTGGCAGCATCGGGAAGAGGCTTCCCTCTCTAATGTGGCTGATCA
 TCTCCATCCCTCCCTTGGCAGACCCAGTGGCACTGCCCTCCCTCACAGCTGTGGTCACTTACCTCAAGTCCCTTTTGTAAA
 90 CTTGACCATGTTTAGCCTTTCTCAGCCTCAACGGATCTTCTTTCTGATCAGTTTAGTCACTTATTTTAAATTTAAAT
 TAATTAATTAATTAATTTGTTTCTCAAGATAGAGTCTGCTGTTGCCAGAGTGGAGTGAATGGCGCAATCAGCTCAC
 TGCAGCCTCCGCTCCAGGTTCAAGCTATTCTCTGCCCCAGGCTTCCAAAGTGTGCTGGGATTACAGGCGCTGCCACCATGCTCG

281

282

CAGAGGGAACAATTGTAATTGGAGACATTAAGAGGGGATTTAAACATGGGACCTTGAGGGATGAATAGAACTCTGGAGTCAGAAGC
GAACAAGAGGGCTGGGAGGCTATGTCTTGTCTTTTACCAGAACTGGCTTGAAGGGTATAGCAATGTGGGGACCCAGCAAAATCCT
GGTGTGGGAACAGCAGACTTGGCTGCTCAGAACGGCAGCCTAATCTGTAAAGTTCTCATTTCCCAATCTGTAATATGGGAGACT
5 GACTTAGGGTTTGGAGGGGTGAGGAAGGGGAGAAATGTTACAAGGTTAAATGAACATAAGATGCAAAACATGGCTTAGGAAAT
TGAATTAGAATTCACCTTAGTGGAGTGGGAGGCAAGAAACAGATGGCCAAGCTCCAGGAGGAAAAGCTGGCCAAGCTGAGCTCAA
CTTCAAGGCCAGCTCGAATGTCACTCTTTGAAGGGGACTTCTTGGCTTCTCCCACTTCTTCCCTCAGCACACCTATTCTCT
AAAGTCCCAAGTGGGACTTCTCACTCTGCAACTGACTGGTCACTGAGGTGGGGTCACTGAGGAGGGTGGAGGGCTACAT
10 CTTTTTTTTTTTTTTTTTCTGAGGCAGAGTCTCACTCTGTGCCCAGGCTGGAGTGCAGTGGCACAATCTCGGCTCACTGAAACC
TCTGCTCCAGGTTCAAGCGATTCTCTGTCTCAGCCTCCAGGGTAGCTGTATTACAGGTGCCACCACCACGCTGGTAAAT
TTTTCTGTTTTTAGTAGAGACAGGCTTTCGCTGTTGGCCAGGCTGGTCTCGAACTCCTGACTTCAGTTGATCTGCTGCTTG
GCTCCCAAGTTCGCGGAATACAGGCGTGAGCCACCGCGCCGCGGAGGCTACATCTCATACATCTTGGGCACATAGTATGCAG
GTACTGAATGAGGCCAGCCTTCAGATGATCAGGTCTGGGGCACTTCAAGAACGATCTGCGTGTATGAGAGAGACAAGCTCTGGC
TGGGAGTCAGCAGCGCTGGGCTGTCTCTGCTGCTCCCAACAGTGGAGGAACAGCAGGGAAGGCACATCGCTTCCCTGGG
15 TGGGAGGCTGAGGCTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT
ACTAAATGCGTGGCCATTTACAGAACTCTCTAAAGCCCTCCAGGACACTCTATTGTTCCCGCCGCGCCCTACTCCAATA
GCAAGAAAATTTACAGGTGGAGACTTTCTTCAACAGGCTTTATTGGCTGGGCACGCTGGCTCACACCTGTAATCCCAGCACT
TGGGAGGCTGAGGCTGGGAGGATTGCTTGGGCCAGGAGTTCGAAACCCAGCCTGGGCAATATAGCAGGACTTCTCTACAAA
AATTTTAAAACTTAGCAGAGCATAGTGGCATGTGCTGTAGTCTCAGCTACTCAGGAGGCTGAGGTGGAAGGACTGGTTGAGCCA
20 AGTAGTTCAAGGCTGAGTAACTGTGATTGTGCCACTGCACTGCACTGCTGTGACAGAGTGAGACCTGTCTCAAAAAA
TGCTGAAGGCAAGGAGGCTGGGAGGCTTACTGAACTCTATCTTGTACTGATGACACCCAGAGACACTGGGCCACCCAGG
GTTTCTAGAATGTTCTAGAATGTTTCAAGTTCAGTTCGCAAGACTAGACATTTAGGGGAGCTGTATGACAACTACCCAAAA
CTGATGGGCAGAAATGCTGTGACCCCAAGTAGGCTCTGGGCTTGTATGACATCTCAGTAACAGAGAGCAGGACCCCTTGTG
TGCTGAAGGCAGGAGGCTGGGAGGCTTACCTGAGCAGCAGGAGGCTGAGGCTTACCTGAGGAGTCTGAACTGCGCAGCAAG
TGGAGAAACGGACCCAGCTCTCAGCATGTGCTTGGGAGTGTCTCCCTCTGTGGTACCAGGCAGCACTTGGCCACCTGTGGG
25 TTGGTGTCTCTCAGGAGAGGCTCTGGGCTCTGAAGAGTAGGTTCCCTGCTTTTACCCGCTCTTGGACACCCCTCTGGGCTTGG
CCCTTCCCTGTGAATCCCTGCTGAGGAAGAGACCCACAGCCCTGGGGTCTCTGGGAGTCTGAACTGCGGAGTCTGGTGTG
CTGGGAGGAGTGGGCTGGGCTGCTGAGCAGGCGAGGGTGCAGGACCCCTCATCCCGCTTCTCTGCTCTCTCTCTCTCTCT
CACCCTTGACTCTCTCACTCTTGTCTCCCTCTCTCCCTCTGTTTCCACTCTCTTCTCTCTCTCCCGAGTCCACAGAGCTGCTCC
ATGCCCCGAGCCAAATTTGGCTGAAGGCAACATCCCTCTCTCGACCTCTCTCCCTTTTTCAGGCTTATCAACTCTCACTTCC
30 TGTGAATGAAGGGTGGGGGGTGGGTAAGAAAGAAAGAAAGCACTTCATGCTCACAACACAACAAAAACAGGTTTAAACAT
TTTACAGGTTTCAACATTTTTCAGGCGGTCTTGTACATCTTATCAGATCAGCCAGAGCCGAGGAGGCGCTCCAGGAGCTGCTT
TGGAGAACAGAGCTGCAACATTCAGCCAGGCACTGCCCCGCTCCACACCCCTTCCCTCTCTCTCTCTCTCTCTCTCTCTCTCT
ACATCCCAAGAGGCTCCCTGGGATGGAGCAGGCGCCAGGCTCTCTCCCTCTGACTGAGGTATAGTCTGTGGCCAAACCTTGG
CTTTGAGCTTCTGCCCCAGCCTTCT
35 CTGAGCTGTGCCACCTCTCGGAAGGCCCTCGTGGCCCTGAAGGGAACCTTCAGAAGCTGCGGGCAGAGGAGTGGTAAAGT
CGTCCACAGCATGTAGAAGTGGTCAATTTGGCCAGCAGGCTAGTGAATTTCCGGGGCTCTCGGGGCTGTCTCTCGGGGCTCTGT
CGGAGGGAAGGAATAGCTTTTCTCTGGTTATCTTTCTCGGTGTGATGGGTTTTCTCTCTATGGCGTGGATCACTGCTGGGA
TATCCCTTCTCACTCAGTCAACCCAGACCTCACTTTCTGTTCTGCTGCACTCAGGTTGACATTAGTGACACAATGCAGGTTGA
40 CAGGTCAGGAGGCTGGCCAAAGCCCAAGGCTCAGAGTTAAGCCGAGGCAACGTGAGGACAGACCAAGCTGGATCCGAG
GACAACAGGGAAGAGCTGGCTTTGTAGCTTGTAAAGGAGCATGGTTAGGGCTGGGAGGTCCTACTGTGTGTTGAGAGGGGTCC
CAAAGGAAGGCACTGTGCACTGAAGCTTATAGGATGATCATAAGAAAGCAAAAGGGGAGGCGGGCAGCGGTGGCTACGCT
GTAATCCAGCACTTTGGGAGGCAAGGCGGAGATCAGAGGTCAGGAGATCGAGACCATCTCTGGCTAAACAGTGAACCCCG
TCTCTACTAAAAAATACAAAAAATTAGCCGGGATGGTGGCGGTGCTGTAGTCCAGCTACTCGGGAGGCTGAGGCAGGAGAA
45 TGGCGTGAACCCGGGAGGTGGAGCTTGCAGTACCCGAGATCGCGCACTGCACTCCAGCCTGGGCGACAGAGCGAGACTCCATCT
CAAAAAAAGAAAGCAAAAGGGAAGGCAAGGAGGTAAGGAGGTAAGGAGGTAAGGAGGTAAGGAGGTAAGGAGGTAAGGAGGTA
TGCACTCTCGTGGGAGCTCGTCCGGAATATGGAAACACAAGCCAGACCTGGGCGCTGTGCTGCAAGTGTGGTGGGAGGGGCTG
AGGTTTGGGAGAGCCACCTTTCAGCCTCTAGTGTGAGGTTTCAAGCCTGAAGCTGGGCTGGCTGCCCCCTGGCCCCAGGCC
CCTCCTGTGCTCCACCCCTTGGCATATGGCATCAATGCTCCACCGTGACGCTCAGTGTCTCCACCGTGTGCCACAGCCA
50 AGATGAGAGGCTAAAGTATAAATCAACTTTAGCTCTTCAAGCATCCAGATGGATTTCTAGCTTCCGCTCTCTTGGGCCC
AGCTCTGTCTCTACGTGTGCTGGAAGTCCCTCTGGCCCCAGCACTTCTCTGTTTCCCAAGCTGCTTTGCTTCTTACCT
TCCCATCTTGTGGACACCATCTCCATCTTCTGTCATCTGGCTCAAACTTTGGCCATACTTCTCTCTCTCTCTCTCTCTCTCT
ATGGAGGAGGCTACAGCTACAGCTTATTCAGAGCTTCTGCTGTTCTGTAAGCCACTGTCTGAGATGACCAAGGCGCCATCC
CCTGCCACAGACCCCGGTGACCCAGACATGGGCTTGGGCCAGCTGCACAATGAGAGCTGAGCCCTGGGAGGTTGCAATGGATC
55 CCAAGGCCAGAGTCTCCTTAGCATCCAGCTCAACCCGCTTCCAGCCGCTTCCAGACCCACCTCTTGTCTCATTTTGAC
ATAACTAACAGGATGATATTCAAAGCCAGGTAAGGAAGGTGCTAGTTTGTCCGAATAATGTCTGGCACTCAGGCCCCCTTCTA
GCTGCTTCCCTCTCTGCTTCTCTGTGTGGCTCTAGACCTGGCTTGGGAGGATGCCACCTTGCTGGGCTGTCCCCCTGC
CACCTGGCTCCACCTGAGGGCCCCTAGCCATCTTCTCAGCTCGGTAGCTGTCCACATGGAGCCCTCAGAGGCAGTGGAGACA
CACTTGGCCCCGTTCTAGAGATCGCTCGCTGACCATGACCTCTGGCCAGAGGTTACTGGGGTCAAGGTTCAAGTGTGCT
TGGGACCATGTCTCACTCATTTAAGGCACCCAGTGCCAGACCTAGTAGGTGCTCAAGAAATGCTTGTGGTGTGTTACTGACA
60 GCAGCCTCTGGGCTGGGTGCTCCTCAGGTGTGGCTTATTAATCTCCAGTTCAGGAACCTGGAACCTGCCAGGCTGAGAGTC
ATCACTCAATTCGTGCTGTGAGTGAATAGGCAGTGAATGACTTGTTTACCAAGGCCAGACTTAACTGCTCTCTGAAGGACA
GGCACTTCACTGACTCCACAAATCACCAGGCCAGTCTTGACAGCTGGGGTAAATCAAGACAGGAGCCACTGGGCTTAGAGC
CCGGGAGCTGCTCCTCATGGTTTATCTCAAGACCTTGGTCCCAGCTCAGGGCTGCACCCACTTACCTCACCCTTCCCTT
CCTGTCTAGACATAGGCAAGGCTCTCCACCCCTGTGGAGATGAGCGGAGCCAGAGGGCCCCGTGAGAGAAATGAATAGCC
65 CCGTTGAGAGGATGAATAGCCCTTAATGGCAAGGCCAGGACATGTCCCACTTCTTGTGAAAGGCAACCCCTGAGGCACTT
GGGCTCTCCACAGCCACAGGACAGCCCCACCTGAGTCCCTTTGGGCTCAGAAGAAACCCCTACCTTGGCCCTGCAGTGAA
ATGTCAAGAGGTCAGACCTGTGCTCAGTACCCGAGGTTGCATGTGTTCCAGAGGGCGAGGAACAGTGGCAGCTGGAATCC
TGAGTCAAGTTCTCTGGTTTTGTCAAGCTCCCTGCAAGGAGGCTGAGGCTCCAGTCCAGGCTGTGGCTTGGCCCTCAT
CCACAGCAGTATTGCTCTGCTACTATGGGTGTAGTTGGGTGCATCAGAGCCACCAGGCCAGCCACGCTGTGCACATGCC
70 CCTGAATGGCTAGGCTTCTGTCTGATCTTGCCAATCCTGAACGGCTTCTGACCTAAGTGGAAAGGTAGAGGCTGAGTTCC
AAAGCCAACGCTTGGTTCTCTCACTTCTGCTCTTCTCAAACTTCTCTTCTCTAGAAAGTTCCGTGAGGTTGGAGGCT
TCTGGGCCAGGAACAAGTTGGGCTCTGTCCAGTACTGCCAGGAGCCAGCAGGTGGAGCAGCTGGCCCTGGCTGTGTTGGGGT
TGACAGGAGCAGCTGGCCCCACCAAGGAGAGGAAATGACCAAGGAGAGGTGATTTCTGACTCTCTCTCACTTCTCTCT
75 CCTCTCTCTCTCAGCAGCCATGTCAGTCAATTTAAGAGACACTAGATCTTCAGATCAGAGTCTAAGATGCTCTCTCTTGG
GCTGGCAGAGTGGTATGATTTCCGATGGAGAAAGGCAAGGGCTATTTCTGCAAGAAAGGCATGACTTGGGGAGACT

284

[illegible]

5 TCAACCTCCCAAGTAGCTGGGATTACAGGCGTCCGCCACCACACAGCTAATTTTTGTATTTTAGTAGAGACGGGGTTTCGCCAT
GTTGGCCAGGCTGGTCTCAAACCTCTGACTTCAGGTGATCCTCCCGCTCAGCCTCCCAAGGTGCTGGGATTACACCGCGCTGG
GCAACAACTCGTATTTTCATGCGCTGTGAGAAGTGGACGTGCTGTCTACCCATGCTTGGGGTGTGAAGGGGGAGGGAACATGGTCA
CTATTTCTTAGGCTTGCCTCAGTCCCATCAGTTCTCTTCTGTACAGAGGAGTAGAGAAGGCTGGAGGGAAAGGCTGGGCAG
10 TGGCAGAGAGGGAAGGCTGGATGTGCCCTCGTGGGGTGGTCTGTGGCCAGCTGCCACTTCTCTCCCCAGACTATCCTGGA
CCACATGCACCTCAAATGCAAGTGCCACGGGCTGTGCGGCGAGCTGTGAGGTGAAGACCTGCTGGTGGGCGCAGCTGACTTCCGTG
CCATCGGTGACTTCTCAAGGACAAGTATGACAGCGCTCGGAGATGGTAGAGAAGCACCGTGAGTCCCGAGGCTGGGTGGAG
ACCTCTCGGGGCAAGTACTCGCTCTTCAAGCCACCCACGGAGAGGAGCTGGTCTACTACGAGAACTCCCCAACTTTTGTGAGCC
CAACCCAGAGACGGGTTCTTTGGCACAAGGGACGGACTTGCATGTACCTCCACGGCATCGATGGCTGCGATCTGCTCTGCT
15 GTGGCCGGGGCCACAACACGAGGACGGAGAAGCGGAAGGAAAAATGCCACTGCATCTTCCACTGGTGTCTACGTGAGCTGCCAG
GAGTGTATTTCGATCTACGACGTGCACACCTGCAAGTAGGGCACCAGGTAGGGCTCCGGGAAGCAGGGGGAGGCTGGGAGCTGG
GCGCAGGGAATGGGGTGTGTGCCCATCTCGTCTTCTTGACGACCCCTTCTGTTTCTAAGCTATCCAAGACACAAAGTTCCAC
AGCCAAAATAGGAAGCTAGGATTTTCAAGCATCCGTGGGAATGGTCTTGGGCAGAGACTTGGTGGATTGCAAAAGCACAGATA
20 AAAACCAAGTGTGGCCGGGCGCGGTGGCTCAGCGCTGTAACTCCAGCACTTGGGAGGCCGAGGTGGACGGATCAACCTGAGGTCA
GGAGTTCGAGACCGGCTGGCCAACATGGTGAACCCGTCTCTACTAAACTACAAAATAGCCGGGCGTGTGGCAGGTGCCTG
TAATCCAGCTGCTTGGGAGGCTGAGGCAGGAGGATTGCTTGAACCTGGGCGACAGAGTTGCAATGAATGAGATTGCACCACTG
GACTCTATCCAGCTGGGCGACAGAGTGAGACTCCATCTCAAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAAC
15 ACATTAGGTGCCAGCAATTGATTAACATTTTACACAAGTTAGTTATGAGCCAGATCAAATTTTGCATAGCTGCTAGCTGTCTATT
CTTGAGCATTATTGGAGATGGGGGCTGGAAGCTGGGAGACCTGACGTCTGGTCTTAACCTTTGTGAGTAACTTCTCTGTTCTTTCA
CTTTCTGGGCTCAGCTTCTTACTATAAAGTGGTATGGTGGTGAAGGCGAGGGGAGTTAAATACCTCAAGCAGCGAGCCA
AAATGTCTCTCTACCCCTGAGGCAGAGTCAGTGTGATCCACCTTGAACCTAGAGGGCAAGTTCTGCAACAGCATAAATCGTAC
CAACCTCAGGAGGTTGGGTGGGGGGAAGCGGCATATAAGCCCATATCTGACAGATCTGAAGCTTGGGTGGAGTGGGGAGCACTCT
CACCAGGTTTATGGATGATGACGGGAGCAGGAGGATTCAAGTTCAGAGTGGCTGGGATGAGTAATCGAGGGATCAAAGGCGGGT
25 GGATTTGTTCCTCAAGCTTCCAGAGGTGGCTGCAATGGGAGGCGCTATGCACTGGCCCTGGGTTCCACAGCACAATAGAGT
CAGCATGGATGAGGAGTGGTCTGACCCCGGGGTGGAAGGTTTAAAGCTGGGGTGGCTTCTTCTCTTTCTGTCCCCTGAGA
AGGAGCTAGTGTGCGAGGCATGAGCATGGGTGTTGAATTAGGCCCTGGCTGTCCAGCTCCTACCATTGCCAAACCGTGTGA
CCCAAGCAAGAAATTTCTCATAGACCTGGTCTCTCATCTGTCATCTCCCAAGAGATGCTGTGAGGGACAATAGAGGACACCGA
GGACAGGCTTGGTTAATTGGGAAGCACTTCCCTGCTGGGTCAATGTTGTCTGGGTGCTGCTGGGCGAGAGCAGCTGTGAAGG
30 GTAGAGTCCCCCTCTCTGCACTTCCACAGGCACTCTGAGCTACTGGCAGATGTCTGTCCATAGGAGTAGGGGAGGGAAG
TGGACGGGCTCTCTGAGATATGGGAGGTACTTGACGTCAATGGGAAGAGCTCTGGCTGAGGGCGACTCACTCAGCCCATAGG
AAGCCCTCGGTGTAGCTCAAGTTCTGTCTGTGGGAGCAGTCCAGAAAGGCAGCAGGTGGCACTACCTTGTGGTATCTGAAC
AAAAGCAGTGTGGGAGTGGGAGGAGCAAGGTGAATCCAGCGCTCCACTCGTCCACTCAGCTGTCTGGCTGGGAGCGCGAGT
35 TTCTCTCTGTTTCAAGTGTGGTGAACAATGGGAGCCAGCAGAACTTTTTTTTTTTTTTTTGGAGTGTGCTCTCTTGTGCGCCA
GCTGGAGTGAAGTGGCAATCTCGGCTCACTGTAACTCCGCCACCTGGGTTCAAGCGATTCTCTGCTCAGCCTCTGAGTAG
CTGGGATATTAGGTCCCCGCCACCATGAGTGGCTAAATTTTTTTTATTTTAGTAGAGACGGGTTTCGCCATGCTGGCCAGGCTGGT
TTGAACCTCTGACCTCAAGTGTATCCACCGCTTGGCCCTCAAAGTGTCTGGGATTACAGGCGTGAGCCACCGCGCCGCGCCAGAA
40 TCAGTACTCTCTCAGCCCTCTTCTCCCATTTCTGAAATGGCAATGAGTGTTTTTTTCTCAATCTATGTAAGGTGCTAC
ATAGATATGGTTTCAAGATGCTGTGTCCAAGTGGTCTTACCCGGAACCCCTCTCTGTGGAAGCTCTGAGGGCTCACTCTGTGA
CCAGTGGAGCACTCTCCCAACATGGTGGCTTCTGATAAACTCCAGGCCAGCTCTTCTGCTCGCTGAGCCCTGGCTTCTT
CAATTTGTAACCTGGGGATGAGAATCTGTCTGTGTAGGGTGTCTCTGTGGACTGGAGACCCTGCACATGAAGGGCTGGCCAGG
45 ACCAGCTGCTCACAGGGCAGCCACAGAGGCTCTGGGCCAAGCAGAGCTGACCTCCAGAGCCACCTCCCAAGGCGAGAGCGCC
TGCTCTGGAGCAATGGGCCAGGCTCGGCCGAGACTCCGTAGGCAAGACGGGAGCCTGCGGGATGCACTGGCAGGGATGGCAGGG
GACAGAGTCGTTAGCTGTTCTCTGTTCTTCCCTGACAGTCTTGGCAGTGCAGGCAGGAGAGAGAAGGAGTTCGACAGACGCC
GGGCCCTCCACAGGTGAGGAGAGAGCGCTGTCAAATGGCTGTGTCTTCTTGTGGGAAAAACACCTTTCTGTAGCTTTTT
50 GTAGCTTTTACCAGTGTCTCTGGCTAACCATGATTGTTGGTCCCTACAAGTGCCAGATTATTTCTCTGCTCACTGCTGTGTGA
ACATGGTGTAGCTGGAGCTGGAAGGTTCTGGCAAGAGTCTGAGTGGCTGGCTGCGCCCAAGTCTGGATCTGTGTTCTGCTG
AGAGACCTTGGATGTGCTCCCTCAATCTGGCTGAGCCTGTTCTGCTCTGTAAAGTAGTCTTATCTTGGCTTGTGAGCCCCCTA
GAAGAGCTGGGGGTGACTGGGAATGCTCAACCCCTTTGTGAGATGACTATGCAATGAGTAAATGAACACACTGCTGCTCC
AATGGGAAGGAATGTTCTGAATTAAGTAGGCTCTCTCCATTTGGACAGCTCATTATCAAGCTATTGTTGGTACAAAAAC
55 AGTGATGCTGGCGTGAGCCAGCAGCAGTGTGACTTGGAGTGGGGACTGGGCCCTGGGCAGGCACCGTTTCTCCATCTG
AGTGACCTGCTCTGGGCTTCTGTTGCCAAGGCCCTCAGCTAGAGGTGGGGAGGTAGAATTCGATCCCATTTCTGTGAGTCTG
AAAGCCTTACTGCTCTGTGACTCATACGACCTCCCTCAACAGCAGGCCCAAGCACAGAGGAGCGTGGAGAAACACCCAAGT
CCTCATGACCTTGAGCACAGGACAGCTGTGATCCATCAGCAGCCTCTGATCTTTGAACCCCAATGGGTGCTCTGGGAAAT
60 GAATATGTTTCTAATTTCTCTCTGATTTTCCCAAGGGCGCTGGGAAGGGGTGAAGTGTGTGGCTGGGCGGATTGAGCAAGT
CTCATGGGAAGCAGGACCTAGAGCCGGGCACAGCCCTCAGCGTCAAGAGCAAGGAAGTGTACCAGCCGACCGGTGGTAAATGA
CCCAGACCAACTCGCTGTGGACGGGAGGCTCTCCCTCTCTCATCTTACATTTCTACCCCTACTCTGATGGTGTGTGGTTT
70 TTAAGAAAGGGGCTTTCTTTTGTAGTCTCTAGGCTGTGATAGGAACAGACCTGAGGCTTATCTTTGCATGTTAAAGAAATAA
AAATGAAAAAAATTTGACTCCAACAGAACAGGCTGGGCTAATGTGAGCTCTCAGCTGGCAGTCAAGACATCAGCTGGGCAAGG
CTGCTCAGCTGAGATCTCTGTACAAATACTCCAGGTAGAGCAGTTGGACTCCAGGTCACCTTAGTATAAGTTAGACAAGGGT
65 CCGTAGGGAGTAGCCATCAATTCCTGAAATCCAACTTTGTGACTAGCAGATGGGAGGATGAAAAACATCCCTTTGCTTCTCT
CCAATACGAGCCATCTTACTGTCTCTTCTCTCTGGGCGCAATGTGAGTAAACACAGACACAGAGTCTTTCCCCCGCTCTT
CCTCCCTCAGCTGATGCTGAGATAGCTTCCATCCATGCACTTCCCAAGGATCTGGATTAGAAGTTCAAAGGGGAACAGCAGTCA
CCTACTCTTGTAGGTGAAGCATCTCAGGCTGAGTCTCTCTGAGGCATCTGGTCCAGCTGAGCGCTGAGAGAAAGCTAGCAAA
70 AGGGAGGCACATGGATTTCACAGTATGAATTTGGTTCAACAACTGTCTTAGGGAGAATCAGAAAGAGAGATGACAGGGGAATGA
GCAGAACAAAGATTTTCTTCTCTCCCTCTCTCTGGGGTCTACCTAACCTGACCTAATAACAGGGCAGGATCTCCAGCT
GGTGAGGTGGGCTTGGCAAGATGGTGTGCGCAGGAGCCGCTTCACTTCTAAATCTGTGGCCACAAGCCCTCAAGATACAC
ATCTCACCCCTCCGCCAAGTCTGAATGCCCTCCCATCTCACCTTAGACTGAAAGTTTAAATCATGTCACTGGATAATAC
75 TTGCTTATGTGAGAACTTCAAGCAATGGATACGAATTTCAAAACAATCTTTTATATCTATGATTTTAAAGTGA
TAAAGTCATGTTTCTGGGGCTATTCAAGTAGCTGACAAGTAATTTAATAATAGTACATGAGTCAATGTAATGATTCTCGCC

GTAGTCAGGTAATAGTATCCAAACCGAAATTTCTACCAACCTGCTGTATCCAAAGTTTTGTAAAAAGTTGTAGAAGTTGTTGATCT
 TTTTGATTTTATATTCAAAAGTCTCTTTTATATAATATTATTATATCAATGTATATACCTTTGAGTTAACTAAGATTATATA
 TTATATAATATATATATATTGGAGAAAATATATTTTCATCATGCAGTTTTTTCTGTAAAGTCATTAAAGAGAAGGTAACAAAC
 CTAATAATGGATACATTGTACACTGTGTGGAGTTCCAGATTAAATGCTCAGGAGGTCAGGATACGAGATTCTGAACATGGTGGCCT
 5 CAGCTAATTAATGACCAAGTGAAGGTTATTTCTCTGTTTTCTAAAGCAAGATCATCAGAGATGTCAGGCAGTGGGTCTGATAC
 ACCACAGTACATTTTTAAAGGCTTCTTTGTCTAAGTTAACTTCTAACAATGAATTTCCAGTTTGAAGAAACAACAATTTGTGTA
 CTAATTCATTTACAGACTCAAGTATTTCAATGTATAAATTAATGTCACAGGCCTCTCTAAAGATGTGGCCCAAGGCCAGCAGA
 CCGCAGGGGTGGCCACTGCCTTAATCCCCTCTCACCACGTTTTCAACTCCATTTAATGGGAAAATAGGATTTTCTCTATTGAAAA
 TGAACCTTGACTGAAAAATTGTCTGTCCCCTGTAGCTCCACTGTGAGAGCTAAGCCGTAGAGGGAGGTAGGCTGGTCTACAAGAAG
 10 AAAGCGTGTGCCCTGGGCTGTGGGCTGTCTGGAACAATTGTCAATTTGAAGTTGGGTTTGGGTTGGGTAGAAAGGGCTGCGCAGTG
 GGCATGCTCTGGGATGGGCACCTCTCAGATCGCCACTTCACAGACCCACTGGAAGCTCAGAGTTATGCTCTTCAACAATGA
 GATGCCACAAGTTGGTTTTATGACACACAGACAACTCTTAGTTTTAGACCTACCCATAAAATGTACCTTTGGTTTTATTGAGCAC
 ATTATTTGAGAGAAACAAAAATGTTTTCTTTTTATTCTCTGACCTACCTCATTAGGAACAAATCTTACCTCACTACGAA
 GAGAAATATGAGAACAGGCTGGGTGGGTGGCTCAGACCTGTAATCCAGCACTTTGGGAGGCCAGGTGGGTGGATCACTTGAG
 15 GTCAGGAGTTTCAGACCAAGCTTGGCCCAACATGGTGAAGCCGTTTTTACTAAAAATACAAAAATTAGCAGCTGGGCTGGGTGGT
 CATGCTGTAGTCCAGCTACTGTAGAGGCTGAGGAGGAGAACTCACTTGAACCTGGGAGGCGGAGGTGCAATGAGCTGAGATCG
 CACCACTGTACTCCAGCTGGGTGCAAGGCGAGACTCCATCTCAAAAAAACAACAAAAAACCAGGAAAAATAAA
 GCCATGAGCCGCTATGGTGGAGCGGGCTGCTCTGCGCTGTATTTCAGACCTGTGACCTGAGGTTAGGAAGCAGCTGAGGTTG
 ATGCACTCTGTTTTGTCATGATGTGCTTTAGCCCTGAAAAGCTGAACACCAAAAACTGTTACACTTCAGCCATACAACGAAT
 20 CGGACACGTACAGGATACAGATCTCTCTACATCTTACAGTCTGGTCATTTTATTTCATTTTCGACTTTTTATTTTTTCTTTTGCAT
 AAAGCTAATGAGGTTGACTACACTTTTCTGAAATGCTTGGGACCAGAAATATTTCAGACTTTGGAAGATTGTCATATATCAAT
 GAGGTATCTTGGGATGGGACCAAGTCTAAACACGAAATTCATTGATTTCAATGACCTTACACATAGCTGAAAGTAAATTT
 TATGAAATTTTAAATAATTTTGTGATGAAACAGTTTAGACTGCAATTTGAATTTTGAATGCCACCTGTGACACAGGTCAGGTG
 TGGAAATTTCCACTGTGGCTCCTGTGCGTGTGAAAAGTTTAGAATTTAGAGCAATTCAGATTTTGGATTTTAGATTAGGGA
 25 TGCTCGACTGAATTTATCTATCCAGAACTTAGGTACTTTTTCTT
 CTCTGTGCCCAGGCTGGAGTACAGTGGTGTGATCATGGCTCACTGACGCTTGACCTCTGGGCTCAAGTGACCTCTACCTCAG
 GCTCCCGTGTAGCTGGGACCATAGGATGTGTCAACATGCCAGCTCAATTTTTTAATTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
 TGTGCTCAGCTGGTCTTGAACCTCTAGCTCAATGATCTCCACCTCAGCCTCTCAGCTTGGGACTACAGGATGAGCCACC
 30 CTGCTGGCCAGTACTTTTTCAATCAATAAGATTGCCAAATATTAAATGGTCCCTATTCACTAATGAAGACCAATTTGTAATCG
 TATGATTAGTTTTAATTTTTAAGAGACAAGTGTCTATGTCACTCAGGAGTACAGTGGCATGATCATGGCTCAACACAGCCTTGAC
 CCCCTGGGCTCAAAATGATCCTCTCAGCCTCCCAAGTAACTAGGACTCAGGCGCACTCTACTATGGTAATAAAAATAAAATCTTT
 TGTAGAGATGGGCTGTGCTGTGTTGCCACTGCTCAAACTCCTGGGTTGAGGGGCTCTCCACTTCAGCCTCCCAAAGTGTG
 GGGATTACTGGGTGAGCCATCACACCTGCCAGTCTTATTTGATGGTTAAGGAGAATACAGTTGATAGCTGTCTGAACATGTA
 35 GTTCTCTCTTATGTATAAGTACTTACAACGTCTAAACACAAGAGGACGTTGTTTTAAAAATCTGAAGAGACGACATAATAGAAG
 ATATCTTTCAAAGCAATATTATTTTGAAGAAAGAGGGAAGGAAAGCATGTGAGACAGTTCAAGGATGAGGGGATGAGGTACAA
 AGAAAGGTGGAAGGAAGAGGTAGGGAAAAAGAAAAGCAAGGAAACATGATGGGACATGATTCTTGGTGTACCTAATGCCGTC
 TCCCTGTGTGGCCCTGGGATAGGACATGTTCTTGTGTGTGGCTGCTGTCACACTCGAGTGAAGTCAAGTCAAGTCAAGTCAAGT
 GCTGCTACACTGCCACTGTTTCTCTAGTTAATAGAGAACCTCTAGGAGGCAAAATTTCTTACCATTAACTTTATACTCCCAA
 40 AATAGTGAGACAGAAGTTGCATGGCTCTACGCTGGGAAATTTCAAACATGATCCTCTCTGGATATTTTGTCTTCAACCACTTG
 GGATGCTTGCCAATCACAGGCGCTATCTCCGCACTTTATGCCATGGTGCCGCTCCAGCACACACCTTTGTGGCTCGTCTCCAG
 GACCCAGTCTCAGTACGGCTTGGCAGCTGATGAGAACTCTACATCATTTTGAATAAATCTGCAACTTACCTGCTTTCTTGAAC
 TCTCATACACACCTTCCCAAGTCACTTATTTATTTTTCAGACAAGAGTTTGTCTGTTGCCAGGCTGGAGTGCAGTGGTGTG
 ATCTTGGCTCACTGCAACCTCTGCTCCAGGTTCAAGCAATTTCTCTGCTCATCTCTCCCAAGTCAAGTCAAGTCAAGTCAAGT
 45 TGATTGCCCGCTCAGCCTCCCAAGCTCTGGGATTACAAGTGTGAGCTACTGCGCCCGGCTGCCCCAGTCACTCTTTAAAGAG
 GCTATGGACCAAGTTGTGAGGCAAGGAAATGAAATCCTGCTTCACTTCTGTGTTGGGCTGGGTGTTGTTTATAGCTGACT
 CACTGTTTCAACAAGTCTGTGATCAGGATTGATTATTGTACACACTTCAATCTACTCCATGATTTTGTGACTTTGTGCTGAAAC
 TTTAAAGGGGAGGCTGCAATTTTAGGATATGAAAAGACAGCCTTAAAGTAAAAACATATTTCTGACTTTAACCACAATTATGA
 50 ATTTTCTGTGTGACATTGAAAAAAGTGTCCAGTGAAGATGTACAAATTTAGAAAGGATAAAATAACCTCTCTTTGAGGTTT
 TGATCTCAAAAAATCTTATGACAAAAAATAGCCGTTTAAACAATTCGCTATAGATGAAGAAACCTAAGGACAGCTAGCTGGA
 GCCTCTTTGCTTCTTACAGGCGGTTCTGTAATCTCATACGCTCTGCTGTACAGCACTGGCTTGAAGAAATATTGGGCAGCTTC
 AAGAACCCACCTTCTCAAGGCTATGACAGGACAGGTGCGCTCAGGGTCTCTCTCCAGGAATCCCGTT

HUMAN SEQUENCE - mRNA
 55 GCGCTTCTGACAAGCCCGAAAGTCAATTCGAATCTCAAGTGGACTTTGTTCCAACTATTGGGGGCTGCTCCCCCTCYTCATGGT
 CGCGGGCAAACTTCTCTCGGCGCTCTTCTAATGGAGCCCACTGCTCGGGCTGCTCTCGGCTCTCTCGGCTCGGTGGCACCAG
 GGTCTCGTGGCTACCAATTTGGTGGTCCCTGGCCCTGGGCCAGCAGTACACATCTCTGGGCTCACAGCCCTGCTCTGCGGCT
 CCATCCAGGCTGGTCCCCAAGCACTGCGCTTCTGCGCAATTACATCGAGATCATGCCAGCGTGGCCGAGGGCGTGAAGCTG
 60 GGCATCCAGAGTGCCAGCAGGCTCCGGGGCGCGCTGGAACCTGCAACCATAGATGACAGCTGGCCATCTTTGGGCGGCT
 CTGCAAAAGCCACCGCGAGTGGGCTTCTGTTACGCCATGCGCTCGGCGCGGCTGGGCTTCTGCGCTCACCCGCTCTGCGCG
 AGGGCACCTCCACATTTGCGGCTGTGACTCGCATCATAAGGGGCGCGCTGGCGAAGGCTGGAAGTGGGGCGGCTGCAGCGAGGAC
 GCTGACTTCCGCGTGTAGTGTCCAGGAGTTCGCGGATGCGCGCAGAACAGGCCGCGCTCGGCTGAACAGACACAA
 CAACGAGGCGGGCCGACGACTATCCTGGACCATGACCTCAAATGCAAGTCCACGGCTGTGCGGAGCTGTGAGGTGAAGA
 65 CCTGCTGGTGGGCGCAGCTGACTTCCGTGCCATCGGTGACTTCTCAAGGACAAGTATGACAGCGCTCGGAGATGGTAGTAGAG
 AAGCACCGTGAGTCCGAGGCTGGGTGGAGACCTCCGGGCCAAGTACTCGCTCTTCAAGCCACCCAGGAGAGGAGCTGGTCTA
 CTACGAGAACTCCCCAACTTTGTGAGCCCAACCCAGAGACGGGTTCTTTGGCAAGGGAACCGGACTTGAATGCTCACTTCCC
 ACGGCATCGATGGCTGCGATCTGCTCTGCTGTGGCGGGGCCAACACAGGAGCGGAGAGCGGAAGGAAAAATGCCACTGCATC
 70 TTCACATGGTGTGCTACGTGAGTGCAGGAGGTATTGCGATCTACGACGTGCACACTGCAAGTAGGACACAG

HUMAN SEQUENCE - CODING
 75 ATGGAGCCCACTGCTCGGCTGCTCTCGGCTCTGCTCGGTGGCACCAGGCTCTCGCTGGCTACCAATTTGGTGGTCCCT
 GGCCCTGGGCCAGCAGTACACATCTCTGGCTCAGACCCCTGCTCTGCGCTCCATCCAGGCTGGTCCCAAGCAACTGCGCT
 TCTGCGCAATTACATCGAGATCATGCCAGCTGGCGGCGTGAAGCTGGGATCCAGGAGTGCAGCAGCAGTTCGGGGC
 CGCCGCTGGAATGCACACCATAGATCACAGCTGGCATCTTTGGGCGGCTCTCGACAAGGCAACCGCGAGTGGCGCTTCTG
 TCACGCATCGCTCGGCGGCGTGGCCTTCCGCGTCAACCGCTCTGCGCGAGGACCTCCACATTTGCGGCTGTGACTCGC

5

ATCATAAGGGGCGCCTGGCGAAGGCTGGAAGTGGGGCGGCTGCAGCGAGGACGCTGACTTCGGCGTGTTAGTGTCCAGGGAGTTC
GCGGATGCGCGCGAGAACAGGGCCGGACGCGCGCTCGGCCATGAACAAGCACAAACGAGGCGGGCCGCACGACTATCCTGGACCA
CATGCACCTCAAATGCAAGTGCCACGGGCTGTGGGGCAGCTGTGAGGTGAAGACCTGCTGGTGGGCGCAGCCTGACTTCCGTGCCA
TCGGTGACTTCCTCAAGGACAAGTATGACAGCGCCTCGGAGATGGTAGTAGAGAAGCACCGTGAGTCCCAGGGCTGGGTGGAGACC
CTCCGGGCAAGTACTCGCTCTTCAAGCCACCCACGGAGAGGGACCTGGTCTACTACGAGAACTCCCCAACTTTGTGAGCCCAA
CCCAGAGACGGGTTCTTTGGCACAAAGGGACCGGACTTGCAATGTCACCTCCACGGCATCGATGGCTGCGATCTGCTCTGCTGTG
GCCGGGGCCACAACAGGAGACGGAGAAGCGGAAGGAAAAATGCCACTGCATCTTCCACTGGTGCTGCTACGTCAGCTGCCAGGAG
TGTATTGCATCTACGACGTGCACACCTGCAAGTAG

Table 10

MOUSE NOMENCLATURE
 ICSNM Batf
 Celera mCG5742

5

HUMAN NOMENCLATURE
 HGNC BATF
 Celera hCG22346

10

MOUSE SEQUENCE - GENOMIC

15

20

25

30

35

40

45

50

55

60

65

70

GCTAACAGGTACCACATGCTTTCTAGGGACTAAGCATGGTGTAGGCAATTTAAATATGTCCATTTCTATGATATATATTGCTATT
 AGATAGGAAAACCCAGGCATGGTTTTAAGCGATTGGCTGGCATCACATGGTTACAGAGTGGCAAAGCCAGACACGAGCTTGCAAGG
 TCAAACCTACAGCTAAAAGACCATTTGCTGTTCTCTGCTTCTTAGGCTTTTCTCCCAACCCCAACCCCATCCCTATCATCAT
 CTTAGGATCTCTGTGAAGCCAGAGGCTGCAAAACCAATTGCTTTTACATTACACTCCCAAGCACCTCACTCCTGGGAGGTGAGACA
 CCTTTTGAAGGCCCGGTGTAGACGGGATTACCCCTCCCTGCCAAGAATAAAGGGCTGGGTGTGTCCCATGATTGCTGGTCTTAG
 CACAACATAGCTTTAGACATGCTGCTTCACTGTTAATCCATTTCTTTTATTATTGTAGCCTCTTTCACCTTTCTCTGTGGTCT
 GCACATGGATGTGAGCTCACTCACCTAGGCATGGGGGCCAGAAGTCAACACAGCTGTCTTTTATTCTTCAACGTTATTTTT
 AAAATATATAATAGTTGTTCTTTGAGAATTTATGTCATACATACCATGAGTTTGGTCAATTTGGCTCCTCACTCTTCTCGCAAT
 TCCTTCTAGATCCACCCCTCACCTTCTACACCTTACACCTTGGTGCCTCCTCCTTCTTTAATAACTCATAAGTTCAATTTGT
 GCTGCCCAAATACACACAATCACTAGAACAGGTCAACCTACAGATGCTCCAAGAAAGCTGAGTTTCTTTTCTCTGACACTTT
 TTGTCCCTTTCTGCAACAGTCTGAGTCTTGGAGGGTGTATGTATGTAGGTGCCATTTGTACTGAACACTCCACAGCACTGT
 TCTCTGTACACTGACAGTTCACAAGTGTGTGCAATTAACACCATCCGCTGTACAAAGAAACATCTCTGTAGAGGGCCAGAGCCT
 CATTAACTCTATGGATACAAGGATGCAAACTGAAAGAACTGCCATTTATCAAATAATAGTAGTAGGCTCACTCTGGAGCCTGTGA
 GTGCCTCCACCATGGGCTTTGCCAGACTTACAGTACCAGGCAAGAGTTTATTCTTTGGAGGAAGTCTTAAATCTATTCTGAAAG
 TAGTTGGGTTAACTCCATAATGGTGTGCCACTAATACTTAGGTATATTGTGCCATGTGGGCATTACTGTGCTACCAGAAATACA
 CAGCTGGGTAAANN
 NNN
 NNN
 NNN
 GTTTTGGTTTGGTTTGGTGGAGACAGGTATCTCTTGTGTTGTGCTGGTGTCTTGGAACTCTATAGATCAGGCTGCCTCGAACT
 CACAGCGATCCACCTTCTCTGTCATCTCTGAGTGTGGCATTAAAGGCATTGGCCACTGCTGCAAGTCTTCACTTTTTTTTT
 TATCTGTAGGAAGACTAAAATTTAGTACCTCTCTCTGCTTTTGGGGGCTGGGTCCATGCCTTCTGCTGTGAAGGTAAAAGC
 AGATTGGAAGCTTCCAGAAGCACTGAGTGCCTCAGGAGCTCTGCTGTGAGTTGAAGACTCTAAAGCGGCTCGGAGCAAGGACGT
 CATTGGCCTGGCTTTATCTCAAGGAGGAGGAGACAGAGGAGGCCACAGGCTGAGACTGACGGATGGAGCAGAGTTTAGGATCTAG
 GAGCTTCTCCCTCAGAGCATCTGGTGATGACAGAGATGTGTGATCTTCTACCTGGGGTCTACTGAAGTCTGGTGAAGTGA
 GGACAGGGGCTGGCTGCTAGGCCAGAGACAGCCCCACAACAAAGACTCCTGTGGCCAGAAGATCAAAAACTGCCCTTTTCC
 TTTCTGCTAGCCTCACGAAGAGCCAGCTAATGATGGTTTCTGCACTTCTATCTAGGCTGAAAAGGCAGGGGACAGGCTACCG
 GCCACTGCAAGGCACTTCTCACCATCACTGGCCATCCCTCTGGCCCTTCCCTGGAGAGCTGTGCCTCAGGTAAATGTTTT
 CTCAACTGTGTTGGGGAACTTCGTAAAACTCCCGCTAGCCATCTATAAGCTGTGAAGGTGTGCTTAAATGTGCTTTTTCCAC
 TAAAAGGTTTGTGTTAAAAAAGAAAAAAGTACAGCAGCCAGGGGATTTTATTATTTTGTGTTCAAAATACTAAATAGCAGGCC
 ATATGAAGACTTCAAAGTTAACACATCTCAAGAGTATCCCTCAAAGGGAGCTCAGAAAAAAGCGGCAGAGTGGGGGTTTAA
 ATGTCGTGAATCAACTCATGGCTTAGACAGGAAAGTTGTAACCTGGGCGGTCTGGTCTGCCTCAGGAACAGCCAGACAGGTT
 GGGCATGAGTGTGGGAGCATGGAAGGAGCTTAACTTCTCCCTAGCCGGGAACAGCAGCCTAGCCTCTGGGGAGCCGGGT
 CATTGTGATGCTCTTAAGAGACTCTTGCTTATAATCCCTAGTGTCTCTTTAGTAACTAAAGGGGTTTCTAGGGAATGGGAGG
 CCAGTGGCCCGGTTATGAAGTACCTAGCCAGCTGGTCTCAGAAAGCAGCTGAGAGCAAGTGGGAGTGTAGGAGGCTTGTG
 CTTGAGGTTGCTAGATACTTGAGGAGATGGTGAATGGATCACTGTCTACTTGAGACTTTTAGGCAGAAGAGTTTGAGGCT
 CTGGGCTGCTAGTGGGACCCAGTGAGTCAACTCTTGATATCCCAAGAGTCAAAGATAACAGAGGCCAGTTGGATCTCTCTCTC
 TTGCTGAGACACTAAGCTGGCCCTGAGGTACACACTGTCCCTACTGGCAATGTGTCCAGAACTTCCATCCACAAAGGGCC
 TCATGAGTGACCAAGCATTAGGGGTCAAGCCAGCATTCTCTCTCTCTCTGGGAAATGTCCACCGCTTNNNNNNNN
 NNN
 TGTGCTCTGGGTTTCTTATGTGACTGGAGCCTCCCTGACCTTGTCAATCACCAGCTAGAGGGAGCCAAAGCCTGTGAACCTGAGT
 TGATAGTTGGATGTTGAGTGGAGCCTGCTTTATGGAACAGGGAAGAGCAAGATAGGGCACCTGGGCTGACATGAATATACAC
 GTTTACACTTAAAAAGCAAAACCAAGAGACCTGTTTCCGATGACCTTAAAGAAACCCCTGTGCAAGGCTTGGAAAGAGGCTCAG
 CAGTAAGAGCACTCCTGTTCTGCTGAGCTCCCGGCTCCATATGATAGCTTACAACCTGTCTGTAATCCAGTTTCTGGGGGATC
 CAATGCCCTTTTGTGACTTCTGAGGCATCAGGCATGCGTGTAGTGCAGTACACAGTGTAGGCAAAATAGCCGTACACATGAAA
 AAATAAATCTAAAAATATTTTAAAAAGACAGAAACCATTTGCGTATGGTATATTCTGCTGATCTGAAACAAAGGTGATCACTAGGC
 ATTCCAATGCTGCTATGGAAGACTGAAATACGGGTGTGAGTTGACCTTAGCCCTTAGAGTTTCTTCCATTTCTTCTTACCT
 TATCCATTCTCTGAAATCAGCAACCAATCACTACTGCCATGGCTCAGAGGAGCTGGAGTCTGCTCCGACCACTGAGGGCTCAC
 CATGGGCAAAATGGACAGACAAGTAGTGGTCCCTGATTGTACATCATCTCTGTTGCTCATGACAAACAGCTGCCCTGGGGCTCTCTGC
 TTATCATATTCACTGGATCCCTGCACATCGGCTTTAATTTACAAGTCTTATCATGTCTCTCCAGTAGCAGAAAAATGCTCTAG
 AGGATTGTACACTATAACTCGTTTGAAGTCTTGAATAGCCTAGAGGAATTTGGGACTTTCCCTTTTGATAATTAGCCAGATGTGGT
 GGAGAGGTGGGCTCCAGTGTGGCTAGCTCCATCATAGAAAGTATCACCAGGAGGCTTGGGCTTATGGCTCAGCTGGAATAAAG
 GTGCTTGGCCAAAGGCTGAGGACTTCAAGTGTATCCAGTGTAGAACAGAGAAATTAACCTCCCAAGCTGTCTCTGTGACCT
 CCACACCCACAGGGCACATCACTACACATACACACACTCATATATACATTAAAGACACCATGACCAATGTAACTCTGGGGGGA
 AAGGGTTTGTGTTTCTTTTACAGGTTGATGTTCTTAAACAGGGAGGCTCAGGGCAGGAATTAAGACAGGAGCTTGGAGGCAG
 GAGCTGAAGGAGATGCCATGGAGGGGTTGCTTACTGGCTTGTCTTCCATGGCTTACTCAGCTTGTCTTATAGAACCCAG
 GGTGGCACCCACAGTAATCTGGACCTCCACGCTCAATTATCAGAGGAGAAGATGTACCCAGGCTCGGCCACAGGCTAATCT
 GGTGGGAATTTTTTTTTTCAAGTTGAGGTTCCCTCTTCCAAATTAATCTATCTGATGTCAAGCTGACATAAAGCAGCCAGCACA
 GTCAGGTTATAAAGTCAGCAGAGGGGACAGCCAGGAGAAACACGCTACTGCTTTGACTCCCTTTGACTCCCTTAAATTTCTTAACTTA
 TTCCCCCAGACATTAAATTTGGGAGTATGGTGGGCTTAAAGAAATGCTCCTCAAGTATTGTGTGTGTGGGGGGGGGGGGAGGTGTT
 TCTCACTATGTAGTCTTGTGCTGAGCTAGCTATGTAGACAGTCTGGCCTTGAAGTCTATGAAGATCTGGCTGCTTCTCTAC
 CCCCCTCTGACCCCAAGTACTGAGATGACAAGCAGTGCACCAACACAGCCAGTCTTCAAATTTCTTAATTTCTTAACTTA
 AATAGGTGGGGCTTAGCTGCTGGTGTATACACCTTAAAGATCAGCACTTGCAGCTGGGCGGTGGTGGCCACGCTTTAATCC
 CAGCACTTGGCAGAGGAGGCGGATTTCTAAGTTCAAGGCCAGCTGGACTACAAAGTGAAGTCCAGGAAGCCAGGGCTGTACAG
 AGAAACCTGTCTTGGGAAAAAAGAACGACCACTTGGGAGGAGAGGAGGTAATCTCTGTGGGTTCAAGGCCAACT

290

291

AAACAATAAAACATGAAGGGACATTCTGGCTAGTTTACCTTTTAAATGCTTAATCTAGAGCCAGTGAATCAGCCGCTCCCTGGC
ATCTCTGCTCTCTGAATTTCTATTTAAATATGGTCATTAGCTGGGCATGGTGGCGCATGCTTTAAATCCAGCATCGGGAGGC
AGAGGACGGGGATTCTGAGTTCTGAGGCGAGCCTGGTCTACAAAGTGAGTTCCAGGACAGCCAGGGCTATACAGAGAAACCTGT
5 CTCAACACACACACACACACACACACACACACACACACACAAAGGTCATTGAACACCTGGCCATGGTCAGGCTAAGTG
CGTTAAGTGCTCTACCAAGTGGGGTGCACCTGATCTGAAAAAACAATTTCTTGCAATTAATCAATCTGCTGAAGGTTGGACAGCTT
GAACCTCAGAGCCCTCCTTTGTAACATAAATCTATCTGTATCCTTGCACTCTCTGCTAAGGCTTGTGTTGCTGTTTCTATT
TAACAATACACTCTGAATTTCTATTTTCCCTGATCATCTTAGGCTGGTCAAGAAAGTAAAGAAAGGCTATCTGTTGCTGTC
10 TGCTATCTGTCTGTCTACCCCTCCCCCTTCTCCCCCTCTCTCTATCTCTCTATCTGGCTGTATGTGTGGGTATATATAGA
TCTTTATATAAATATGTGATACATATGTATGTATAATATTATACACTAGTTTTAGAAGATTGTTCCATTTTAACAGTGTACACA
AGAATAACCTTTGGACACAGTCTCTCTACTATAACATTGTAAGGCAAGTCCATAGATGAGGATGCTGGAAACATGGATATCTGA
ACAGCAACACACTTTATGGGTGTCTATAAATTAGGCAGATGGTTAAACAGGATATTAAACAGACTGTGATCCACTACGCAATAGAAA
TTGAGGCTGACACTAGAAAGTGGCCATGGAGATCTTTGTGTATAGACTTAGAAAGATGTCTGCGAGGCTGAATGAGCTAATCAAGC
CAGGGGAGTGTGACAGACCATCTGCTAATGTGAAGCTTGCAAGGTTGGGGATGGAACATAGTCTCCAAATTACCAATGGTGG
TTACTCTGAGTGCTGGGTGGGGTAGCTTGCTTCTCTCTGGTGTCTTTGCACTGTATTGTGACTTAATGTGCTGTTTAAA
15 CAATCAAGAAATGTCAGAGTCTTTACAAATCAGCTATTTAGTTGGGGAAGAACACACCAAGGCAATTTACCACTCAAGCTC
TATCAAGGACGATGGGCTGCTCCGTTAGGGTGGGAGGGCCCCAGACTTGAGGAATGTGTGGCTGAACTGGATTGTTAGTACCAGC
TCACAACCCACAGCTACCCCACTCAACAGGTGTGAGGAGCTCTCTCAGCGGCACCAAGTGTGGCTTCTGCTTCCCACAGCAGT
GGACTGGTCCACAGGATAAAGGTTCTTTCCGGCTTGTTTTTCATAGCTCACCATGGGGCCCCATAGTAGCTTTCAGAGGAAATG
CCACTAAGTGTGGCCACACTGTCTTGTTCATAGGATCAAAGTGTAAAAACGAAACCTTGGGGTTTTAGGCCAACCTGTCTGTT
20 ACCAATGAGGAAATCAGTGTCTTCTCGGGGACACAAAGGACCCAGGTTCTGCTTCTTACCAGCCTGTATCTGTTTGTGTAT
ATCTTAGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTT
GGATGCTTACACAAGACTCTCATTACTTCCAAAACATTTACCAACAGGGAGAGACCATAAAAGGAGTTACAGTGGATAAAGCCTA
GAGTTTAAAGAAATTTATTTATATGTGCAATTGATTGGTGTCTGCTGCTGCTGCTGTTTACAAGGGTGGCAGATCTCTGGAATC
25 GGATCTACAGACCTTGTGAGCTACCAAGTGGGTGCTGAGAAATGACCTTACAGTCTCTATAAGAGCAGCCTTGTCTTCAATGCT
CTCACCAGCTTAGGCTAGAAATTTAAAGGCCCGTTAATTAGAAGATGTAAAGGCAGGACCCAAAAGGATGATGGTATTTTGTAA
GAATATATTGTCTAAATTAATACATGATGATTTAATATGTATCTAAGAAGGAAAAACATCTTGTGAGAGAAAAACATCAAGA
CACTCATCACTAAGTGGGCAGAACTACACAGAACTTACACACATTTTCTACCCAAATGAAATAACTAATTTCAATTTCAATTT
GATGACAAAAACAGTACACATTGAGACAGGGTTTCTCAACCTCAGGGTGATTGACAGTCTGAGTCTTATACATTTTCTTTTCT
TAGTATTAAGGTATTAAGGACCTTATGACAGCTGGGAGTGGTGGCGCACGCTTAAATCCAGCACTCAGGAAGCAGAGGCAGGTG
30 GATTTCTGAGTTCGAGGCCAGCTGGTCTACAGAGTGAGTTCCAGGACACCCAGGGCTACATAGAGAAACCTGTCTGAGAACT
AAAAAAGAAAGACCTTATACATCAGGCTTAACACTTACCGCTGAACATATACTCATCTTTTCCCTCATCTTTTCAATTTAA
AATTTGAGACAAGGTATCAAAAGCTACCCAGGCTGGCCTGAACTCACTGTTTAGCCAGGCAGACATGAACTTTCAATCTG
CTGCTCGCTTCCAAAGCAGCTTGGGATTGTGGGCTACACCCCAAGGACTCTAATAATTTCTGATAATTACTATATATGGCTGT
35 CTGTGACCCGCAAAATGTAACTCTACCCAGTAGATGCGCATAGATTCTGCTCCCTCCAGTTATGACATCTGGAACTTCCAGCT
ACCCCTGAATAGAAATAGTTACCCCACTTGGTTTGTATGATTTAGGTTCTGTTTAAAAAGGTGTTTGTGTTTGTGTTTGTGTTT
GCTTCATTAGAGTTGACAGCTTGCACCAAGTAAAGCAGGACCGGAAAGGATGGCGGACGGCTGGAACCTTTGGAGTTCCGAGA
CTTGCCCGCGGGCCGGGCGGAGGAGGACCTTCCAAGTTGACTTTGCGGGTGGAGGGAAGTCTCTGGAGTTAGCAGCACTGT
GTGCTTGCAGCTGTGGGCGTGGAGAGAGCGAGTAGCGGCTGGAGCAGCGTGTCTCTCCGAAACCGACCGGCGCCAGCTGCGCGG
40 ACTTCCCGGACAGCGTTTGGCGCGCCACCCGCTGGCCAGCGGCGCCAGGATCATGCTAGACCCGAGCGGCGGGGTGGGCGT
CTTCCACTCTCTCGGCTGCGTTTGTGAGTGTAGCGGTGAGGCTGAATCGGATCCACACAGAAACCCAAACAGTGGGCGAGT
GGGACTAGGCGCTTCACTAGGCGCTTAAAGAAATCTTCAAAAACCTAGTTGGCACAATTTCTTCCATTAGAAAGCATGGCATCCAGT
GCCTCTCTGTGACTGCTCTGGGTGGCTTCAAGTGCAGCAACCTTACATCTCAGGAGCTGTAGTCACTTGGGCGAGCACTCATGT
TGTGTACCCGCTCAACAACAGTATGGATGATCAAGGTGGCTTCTAGTGTCTATTGCAACAGGAGATTTTGCACGCCATC
45 AGAATGTCCCATACCCCGCAACCATCTCAAGTAAATCTGATCATGCACTTGTAGGTTGGCCATGAAACACAGTACTTGTGACA
CTGTAGCCATTACAAAGTTATAAAAGGCAAGAGCAAAATATCTTTTCACTAGGTTGAGCTTCTACAGAAAGAGTATACACT
TTGTTGAAAAAACAGGATGCTAGTAAAGTACGATGCGAGCAGGTGTAGGAGCTAGGATTATGAGGTTGCTTACACTTAAAAAG
CTCTCGAAGGTAGGCAAGGTGTACAAGCTTAAATCCAGCACTCAGGAGCGGAGGAGAGTGGTTCTGATTTCAGGCGCCCT
GGTCTATATAGCAAGTTCCAGGCCATCAGGGGTTCTAGTGAGACCTATCTCAAATTAATTAATCTTAAATATAGTTATAGTGTG
TGTATGTATATATATATATACACATATACACATGAGTGTAAAGT
50 TGTGTGTAAAGATGGCCAAAGTTGAGAACTCTGAAGAAACTCTGAAGAACTGAAATATCGCTGTTAGGTTTGGCAGGAGTTATAATTTAT
CTTCTCAGCTGGAGCTCTTAGGGAATGAAAAAGGAGTCTAGCAATATCATACCAGGACAGCAGAGATGAACTTGGAGCCATCCC
CAGAAAGCTTGGGAGAACCAAGGACAGTGACCTGGATCACTCACTAGTGCAAGGAAAGATAGAGTTCAAAACCAAGCAGATTAG
GACCAAAAGGCCATTTCTGTGTCAGCATGGAAGCTTAAAGCTTGGTCTCATGGGCTTTACATTCACTAGGCTTGGAAAC
AATTCAAGATCTCACTAGCTACACATCATGAAACCGCTTGCACACTGAGGATCACTGCAAAACACAGAGGAGCTGGGAAGACC
55 TGGGAAACGGGGCTGTGGAGAGCTTGGGGCCAAACACAAATGAAGCATCAGAAACGGAATGTGAAGCCAGAGTCGGGGTGAC
AAGGATAAACAGATATGTAATACAAGGATGGAAGATAGGAAATTTGGAGCACAAAGACCATTTGTATCCAGGCTGGGGATTGCT
CTCAACTGGAGACTTTTTAGGTAGACAGCTTTTATTAATCTTAGACAGTTTATACATATAAGCAGTACATATTGATCACTCT
CTGTCCCACTCTCAGGATACATTTCTCTCTCTGATCTACCTCTGATACTGATACCTGTGTGTGTGTGTGTGTGTGTGTGTGTGT
TGTATATGTGTATATATATGTATATGTATATGTGTATATGT
60 TGT
TGAGT
GCCAAGGCTGATGAAGCACTAAGTCTGTGGTATAAATATGAACAAGACAGTTTGACAGCTTGCCATTAAATCAGAACACAGGATC
AGGTTACGTCCTTACCTACCACCTACCATCCATGCTGCTCACCCTTCCACCCGGGCTAGACCCCTAAGCAGCATGA
GGCCTAAGTCTCTTAAGCCTTGAATTAGAGAGAAAGTAAAGATGTTTCTCTCTCTGGGAGAAAGCAGAGCTCCAGCTGGGGTG
65 TTGATTTGTCTGCTCAGCTCATGCAAAAGTTGGTCTTGCCACACAAACCAACCTGCTGTCTGTCACTTGTGAGTCTTGGCACACA
AACCAACTGCTGCTTGTCACTTGTGAGAAAGAACTATGCCCTTCTGTCTGTGGGTTTATGAGAACTCTATGTTCAACGCTTAC
CCTCCTTGGGTTGTGTGATCCGGGAAAGTCAAAATACAAAGGAGGAAATTAATTCAAAGTCAAGTGGTGTCTACTCTCTATATGG
CTGGGCTTTTGAAGAAAGAACTCTTAGATTCTTTGTAACTGTTATAAGCAGCTGGAATGTTGGGTTAAACACTCCCCGCTAG
CCTCAAGATGCTTAGGTTCTAGTGTGAGTACACCGCTCAGGAGCAATTTGTCACATTCCAAGCTAGCAAGCAAGTAAACAGATTGG
70 CTGAGCATTACATTGTGTGTCTCTGTGCGAACGCTGAGGACCAACGATGGAGACCATAGCAGCTTCTTCTGCTGCTGGAGG
AGCTCACAATCCAAAGGACCTAGTGTGAGTGAGGTTAACTGGTGTGAGTTACACAGATCCCCCTTAGCTTGGCACTCCCAA
GAAGCAGGGTGTGGGACCGGGCAATGTGTGAGTGAATGCAGTTGTAGCAGAGCCTGTGACATTAAGTTTGAACCTTGAACCTTGA
CTCAGAACTGACTCTGGGAAAGTAACTTTGACCTTCAAGGCTGCCACTCATTGAGTCTGCCCTCACACATACATCATA
CACACATGTAATTAATTAATTAAGTTTGAACCTTAAAGAGTGTCTTGGGCCAGGCAATGGTGGCGCCGCTTTAATCCAGCA
75 CTCGGGAGCAGAGGCACTCAGATTCTGAGTTTGAAGGCCAGCTGGTCTACAGAGTGTGTTCCAGGATAGCCAGGACTACACAGA

293

[illegible]

CTGTCTCATGACTTCTCACC GGCTCACCACACCTCCACCATCAAGGCCAACTCCATGGTGTGCTTAGATGAGGTGTACGGCCCT
GCTCTCCTGAGTGGTGACGTGGTGAAGGGTAGGGCCAGCTCTCCACACTCATGACCTGTGGGGCAGCTTTCCCGACTGTGACAG
GTGATAGGGGGCAGGGCATGATCTCTGTGCCCATGCCACCCACGACAGTAGAGTGCTGTCCCTGGTGGCCACCTGGCCCCGACT
5 CTCTCTCTGTTTTATGCTGATATGTGATGTGAGTTAACTCCCTTAAGATAAAACAAAACCGAATACTGCTTGAGTAATCTACTGG
TAAGCAGAGCTAAGAAAACCTCTCTTAGAGAATTTATAGGAAAAGGCACAGATGGATCCTGTGCTCAGGGGTCTGCTGGTAGAC
TCCTGTAAAAACGCTGCCAAGCTGTCAATGACAACCATGGTTGAAAGGGGTGGCAGAGACTGGTCATTGTCTTATATTTCTTGG
CAATAAGATAATAAGTTCATCTCTCTGCTACATTGCAGCTAGACCTGGCCATGTGACACAGTTCTAACCATGAACCTTTAAACAA
10 GTAGGTCCTTACAAAAAAGCTCTTTAAAAATTGAAGCTGTGAGGGGACTGAAGAGATGGGTGAGTGGTTAGAGCACTTGTCTTTC
AGAGGACTAGGGTTCAGTTCTCAGAACCCATAGGGTGAAGCCATCCATAATTTCAATTCAGGGGATCTTATGCTCTGTA
ACTATGAGAGAACACGGCACACATGGTGCAAAATACACGCAGGCAAAACATTATACACATAAGAAATAAGAAATCTAAACAAAGACA
AAACAGTGAGGCTATCCAGTGAGCACACACATTCACCTCTTTCCTG
15 GATGTAATACTAGAGAGGGAGCCACTATCTTAGGACCATGAGCAAAACCATGCATGCATGGAAAGAAAGGAAAGAGATTCTAGGTCA
CTGATAATTTTAAAAAAAATGGGGGGGGGGGGCTGGAGAGATGGCTCAGCGGTTAAGAACACTGCCTGTTCTCCAGAGGTCCTGA
GTTCAACTCTAGCAACACATAGTGACTCACAACCATCTGTAATGGGCTCCAATGCCCTCTTCTGGTGTGCTGAAGACAGCTAC
ACTGTACTCATATATATA
15 GGTATA
NN
NN
20 NNN
NN
NN
NN
25 NNN
NN
NN
NN
30 NNN
NN
NN
NN
35 NNN
NN
NN
NN
40 NNN
NN
NN
NN
45 NNN
NN
NN
NN
50 NNN
NN
NN
NN
55 NNN
NN
NN
NN
AAGATTAGATTGACAGAGAAGACTTCCAGAAGACCCTGACTTCAGA

MOUSE SEQUENCE - mRNA

GCAGTCCCTCTGCACCCGAGAGAGGAGGACGACGGGGTCTGTGAGAGGTGTGCTGTTGGGCAAGCAGGGGAGGTACCTGTGGAAG
60 GTGGTGTGCTGGTGGCCCCCTAGCAGTCAAGAAGGGGAGCCAGCTAGTGAGAAGATCGCCAGAGGCATCTGGGACGGTGTGGGAG
AGCCCGGAAGATTAGAACCATGCCTCACAGCTCCGACAGCAGTGACTCCAGCTTCAGCCGCTCTCTCCCCCTGGCAACAGGACT
CATCTGATGATGTGAGGAAAGTTGAGAGGAGAGAGAAGATCGCATCGCTGCCAGAGAGCCGACAGACAGACACAGAAAGCC
GACACCTTCCCTGGAGAGTGAGGACCTGGAGAAACAGAACGAGCTCTCCGCAAGAGATCAAAACAGCTCACCAGGAGCTCAA
70 GTACTTCACATCAGTGCTGAGCAGCCACGAGCCCTGTGCTCCGTGCTGGCCAGTGGCACCCCTCGCCCCCGAGGTGGTATACA
GTGCCATGCTCTCCACAGCCTCACATCAGCTCGCCACGCTTCCAGCCCTGACCTTCTGGACAAGAAGGGCGATGCTACTCCCGT
GATCCCTTGGAGGGCATGTAACACTGAGGCGGGGCTGCCCTCATACCTCTACCCAGAGGCCAGTGGCAGAGGCTGGACAGAT
75 TGAACACAGAACTGTAGTGGTCAGAGGACTTAAGGCTCCAGGGAAGTATAGTCAATGTACTGGACTCTCCAGGGAGGTTGG
AGCCAATGTACTGGACCAAAAATTGACAAGTCAACCCTGGACTGTATAGATGATGCCCAAAATACACACACAGAGGGGAGGAG
GGCAGGGGTGGATAGTTTCTAAATAAATTTTCAAAAAACCAAAAAA

MOUSE SEQUENCE - CODING

ATGCTCACAGCTCGACAGCAGTGACTCCAGCTTCAGCCGCTCTCTCCCCCTGGCAACAGGACTCATCTGATGATGTGAGGAA
AGTTCAGAGGAGAGAGAAGATCGCATCGCTGCCAGAGAGCCGACAGACAGACACAGAAAGCCGACACCTTCCCTGGAGA
GTGAGGACCTGGAGAAACAGAACGAGCTCTCCGCAAGAGATCAAAACAGCTCACCAGGAGCTCAAGTACTTCACATCAGTGCTG
75 AGCAGCCACGAGCCCTGTGCTCCGTGCTGGCCAGTGGCACCCCTCGCCCCCGAGGTGGTATACAGTGCCCATGCTCTCCACCA

[illegible]

297

CCAGGACTCATCTGATGTGAGAAGAGTTCCAGAGGAGGGAGAAAAATCGTATTGCCGCCAGAGAGCCGACAGAGGCAGACAC
AGAAAGCCGACACCCCTGCACCTGGTAAGTGGTCAGATCAATCTTCATCCTCGTGAGCTTAGGCTTTGCCCTCGGCCATCTGGGAA
CCCTTGACCATAGCTTTGATTCTGCTTGTGTGGGATGTGTATGTGGGGTGGGTAGTGGAGGGTGAGGGCCGTGGGGTGAGGTA
5 GGGAAAGGAAGCTGCTGAGAGTGCTTTAAGAAGGCTCTGTAGTCCGGGCGTGGTGGCTCACACCTGTAATCCCAGCATTTTGGG
AGGCCAAGGCGGGTGGGTACCTGAGGTGAGGAGTTCGAGACCAGCCCTGGCCAAACATGGTGAAACCTCGTCTCTACTAAAAATACA
AAAAATTAGCCAGGCATGGTGGTGCATGCCCTGTAGTCCCAGCTACTTGGGAGGCTGAGGCAGGAGAATCACTTGAACAGGCAGAGG
TTGAGTGAGCCGAGATCGCGCCATTGCATTCAAACCTGGGTGATAGGAGTGAACTTCATCTCAAAAAAAGAAAAAATAG
AAGGCTCTGTAGCAGGGAATGGGCCAGGAGCTGAACAGAGAAATGGGCCTTTTACCCAGGAGGGCTCAAGGGGTGGGAGAGG
10 CAGAGCTGTATTGGGAAAGAAATTAAGAAGTATCAAGTGCTTTGGGGACGGCCATTGTCTCGCAGTGCAAGGACCACACATAGTC
GCATCCCTTGGCAGAGACCCAAATGCCCTGCATTTGACACAAGGAAATTCACAGGGCGCTGTACCAGATTCTCTTTTTCAGAGCA
TTATTAAGTCTTATTTTGAATTTCTGTCTTAATGGTATCCCAAGGGTCTATGAAGATGCAATTTCAAGTGCCCTTATCTGG
GATGATCACCATCTAGTTGAGTTGCCCTTAGTCCCAAAATTTTCTAGAGAAAGCTTTTACCTCTGTCTTGTAGTGGTCCAGGGCC
TTGAGCAGTGCTGAACCTGCAAGTTCGGCCAGTGCCCAAGGCCCTAGATGGTGTCTTAGGTTCTGGCTGTGCCCTTATAAGTACT
15 GCTTCTCTCCCATGTGCTCATACCTTACCACCTTACCTCTCTTCACTCTGCCCCAGTATGGTCTTGTTCACCAACTCTTCACTA
GTTCCCTTCTCTCCATCCCTCATCCCTTCCCTAGCAACTCTACCTTCTGCCCTTGTCTCCAGAACTCTCCCTTACTCTAATA
GCCTAGCAATTCCTTCCATGGAAGAGTCAATTTGGCACCAGAAATCAATAAGCTTGTATTATCTGGAAGATTAGCATGATAAT
CAGCCAGTTAGATGGCTGTGTTAAACGATATCAAGAATAAGTAAGTAAGTAGTATTTAGGGGAAATATGCATCTTTCAGCTTT
ACAAGGAAACAGAGCAGACTGCACCAACAGCTCTGATTGGGTCTGGGTTTATTGAATGTATTACAGCTTACATCTTACCTTGA
20 CACTAACATTAAATTCAGCTATTTGTTAACTTTTGGAAAGATGAATGAACAGAAAGTCTGTACTAAGTGCTCAACAGTCT
GAATGTCAAGTTTGGTGGCCCTGCTGCTGTATGTTCTCATGATTCTACTGTGTCCCCAGATCTTGGTTTACCACCTTAAGCT
TGAACATCTATGATCTTACCTCTTCTCTACAGAGTCTGATTCTGATTCTGATTCTTTAGGGCAAGCAACAGACCATCAAA
ATTTAAAGGATAAAATCTTCTTGTGTACAAGTAGACAATGCTCTCAGACTGGCAACTGCTGTAGCTTTTAAAGTGTACCT
GTTTCTTAAGTGAATGTAAATATAGTTCTGGCAGCTCAGCAGTCAGAACAGGGATTGAATCCAGCCCTGCTGCTTACTTCTGT
GTGACAGAGACGTTCTTGGCCTCCCTTGGGCTTGGTTCTTCTAGAAAATGGAAGATGAACAATACTACCTTACAGATCTG
25 ACATTTAAAGAGCCCAACACAATGCTGTCAATCATAAATCTCAAAATTTAAGTATAAAGAGTAATAAATATATCATAAGA
AGCAAGATAATCAAAATTATACACATTTATATATATGAAACATATATACATTTTGTGTATATTAAATCAGAGAGCTCA
GGGTGGAAGGTTTCTTAAAGGCTAGAAAGTTAGACATAAGTTTGTATGCTTCAGACTTCTCTGCAACACCTCCAGCCTCAAGTGT
ACATTTAAAGAGCCCAACACAATGCTGTCAATCATAAATCTCAAAATTTAAGTATAAAGAGTAATAAATATATCATAAGA
AGCAAGATAATCAAAATTATACACATTTATATATATGAAACATATATACATTTTGTGTATATTAAATCAGAGAGCTCA
30 GGGTTGGAAGGTTTCTTAAAGGCTAGAAAGTTAGACATAAGTTTGTATGCTTCAGACTTCTCTGCAACACCTCCAGCCTCAAGTGT
CAGTTTAAAGGCTGCTTCTAGGGCTGGAGTCTTCTCTCTCCCAATTTATGAACAGAGAGTCTTCTTATGTTAAAGTGTGCA
CCCTGTCTCCCTGTAAATCAACTCACTGCTCTTCTCCAAACCTTGGGGAACGTATTAATGAGGGTGACACAGATGTCTCTT
GCTGCGGCAAGGCTTTCAGCACTGAATCAGCTCTCTCCCTCTCAAGACAAATGTCAGAGCCCAAGAGTCACTCATTAATTAT
35 ACAAGTCAATGTGACATTAGGTAATCTCTAGAGCTTGAAGGCTCCACAGAGCCCAAGTCAATAGTCAACATCTCCATAGCCACAC
CCCAGCCTCAGTTTCTAGAATGTTCCAATCTTCCCACTCTGAACACAGATCTCTCTCCACTGCTTCTTTTGGAGCACCACAGC
ATCGCTTACCTTTTGGCCCAATGAGTAGGTCGAGCGGAGTGTATGACAGAGCCTGCGGACTGCTGCCAATGCACTTATGTTT
CTTGGCTTACAGTAGAAGCTTTTGGCAGCAACGTTGCTCAATCTGCCCTACATCAAAATAGCTGTGGTTGACATCTCTTCTCTCT
35 CGAGATGACAATCACCTATCTTCTCCATCCATTATCTCTTAATTATGTCTGAGATTCAAGTGAAAAGTCTTCTGGTTTACACCA
GTGTCAAGGCTCAGTGTGTGGTTTGGCCCTGACTCCTTCCATGCTTGGCTCCACATGCTGGGGTGTCTCTGGCCCTCAGACAT
GGCCATAGGCTCGCCTACAGTGTCTTACAGATGAGGCTTGGGAGCTACTGAGAGTACCATATCAAAAAGGACACATCTCTTA
TTAGGGTCTAGCCTCATATATACTGGTATGTTTCTTAGTTTCAACTGCTGTCACTATTATCAACCTTAAATACTGAAACAATT
40 ATCTTGTCTCTAGTGTAGAGTGTGGGATGCTTACTATTTCGACATTTTTCAGCATCTATCTATAAATGGCTGGCACCAGACATG
TACATCGATTGCTTTAAAAATGACAGAGTAGGAGAGGCTCTTTTATGATTGTGTTATAAATCCCTGGCCTTGACTCTCTCT
GACATAAAATGGATCGGTGATTCTTCTGTAATTGTGACATCAACAAACAATCAATCTGTTTAAATCTCTTCTTGTGAGCAT
CTCACACAAGCACCCTGCACACTTAGTTCCTTTCTCTCGAGACAAGTGTAGGGTTTATTGTATATAGTACAGATGTTGATTA
45 AAAGAGAAAGGCATAACTTGACCACTTAGTTTCTAAAGATATCAATAGCTAATAAGTGGACCTAAGATAATCAGTGAAATA
TTTGAATTAAGAGAAATGACAGTGTGCTTCTAAATTAAGAAATGTAATAAGCTTCTATATGCAAAACATAACCAATTAGG
AAATTAATGGAAGGAAAGATCTGTATTAATACCAATGACAACAGCAAAATGGAAGGAAGGAATAATTAAACAAATTTATGAAGA
GTGTATCTTAATGATTTTAAAGATTCAATAATTTGGAAGATATACCTTATGTAAAGTTAGCAATTTCTTAAAGTTAATTGA
50 TAAATTTAAGTATGAGATCCCAATAAAAGCCCAATAGGGTTTCTGGGATTGGGCAAGAACTAGATTAGTCTTCTTAAGTTCCAGT
GAAAAAATCATATGCAATGCGCAGGAAATTTAAAGAAAGATATAATGAAAAAGATTAACTGACCAACATATTAAAGTGA
AACCAATTAACAGAAATCAAAACAAATGTGGAAGAGACAGAACTTGAACAGGATAGAATATGGAACAGACCCAAAAACAAATTC
55 GATTTTAAAGCCCAATACATATTCACTCTAGGACACAAGTGTAAATTAATAAATAAATAAATAAATAAATAAATAAATAAATA
TCCTAGCACTTTGGGAGGCCAAGGTGGGAGATCACTTGAAGTCAGGAGTTTGGAGACCAGCCTGGCCAAACATGTTAAATGTTAAAT
TTTTTAAAGAGGAAAGCTAAAGAACTTGAAGAGCAAAATACCAATTAATTTATCTTGAATGAGGAATTTTCTAAATA
50 AAAATAAAGCCCAAGCCATAAGGAAAGATTGATATACATTACTTTTATTATCAAAAAGTAAAGATTCTTATAGATCAAA
ATACTGTATGCAAAATCAAAGGCAATGACAAGCTGAGGAAAAATATCTGTAATACATATGACCAAAAAGGTATGTTTACTTACT
ATATGAGAGAGCTCTTATGAATAGGAGATGATTAAACCCCAAGAAAGAAATGAACAAATGGGCGGGCGGGCGCTCAGCCCTTA
60 ATCCCAAGCAATTTGGGAGGCCGAGGCGGGCGGATCAGGAGTCCAGAGATCGAGACCATCTGTCTAACACGGTGAAACCCCGTCT
CTACTAAAAATACAAAAATTAGCCAGGCGGTGGTGGCGGCTGTAGTCCAGCTACTTGAAGGCTGAGGCAGGAGATGGCG
TGAACCCGGGAGGCGGAGCTTGCAGTGAACCAAGATAGCGCCACTGCACTCCAGCCTGGGAGACAGAGCGAGACTCCGTCAAAAA
AAAAAAGTAAAGAAAAATGAACATGACTATGAATAGGCAATTTACAGAAAAGAGAAATAGTGGCCAAATTAATGTGTG
65 AAAAGATGGTAGACCTTATTAGTTAGGAAATGCAATTAAGGAGCAGTGTAGGCTGGCAAGATGAAACATGTTGTTGATACAC
GATGTTGCCAAGGTAATGGAAGAGCAGGCACCATCACACAGCTAGTAGTAGTCTGCATAACCCCTGGTAGAAGGCAATTTGCC
CAGCTCCATTCAATATAGGTGCACATACCTCGGACTCAGCAATTTGACATCCAGGAGTGTGTTCAACAAATCCACACATC
ATACAATTCTGTACATGTAAGATAATCATGCTGCATGTTCTTATAGGAAAGACTGAACATAAGCTAAAAAATCCCAATA
AGGGATTCAATAAATATTGTCATTCTGTGGAATATTGCAGATATGTTAAATAATGAGTTACATCTGAATGTGCTAATCTGGAA
65 GGATTTACTTCTGTACTTTAAGTTAAAGGCAATAATATAGTCCATAGTTTGTACCATTAGTTTAAATTTAATGTTTAT
CTATTTTATTTTATTTTATTTTATAGAGACAGGCTCTCAATGTTGGCTGGCCAGGCTGGTCTCGAACTCCTGAGCTCAAGTGATCGCC
CTGCCACCTTGGCCTCCCAAGTGTGGGATTACAGGTGTGAGCAACAGCAGCCAGCCCTTCTGTGTTTTTAAATAAAGGAA
AGTTACATATATGATAAGTATAATGCAAACTTTTCAATAGATTATAAAAAATGTTAATGATATTATTCTGAAAAGTAGG
70 ACTAAGATCTAAAGCAAGAGGAGATACTTGGCATCTTACCTTTTATACAGTTTGGGATTTTTATACAGCTTTTATCTT
ATAATATAGATATCAAAATCTCAGCATTGATCATTACCACACATGCATTAGGAGGATTTCTTTCTAATTTTGACATCAACAT
GAATAATCTTCCATCAGACATGGAAGAGTATTCAATCTGACGTTATCTTTGAACATCATACATAAATCTCAGCCCTTGGGA
GAACCAACTGTAAGTTGGGATTGTAGTACTTAAAGTCCAGTACTATATGATAAAGATGGCAAAATCGTTTCTTGTGTAG
75 CCATCTTGGTTGGTTCATGGCTATCTGGTGGCTACAGCTGGAAGGATTTCAAGTCAAGAGCCAGGATCAGTGGAAAGAGAG
CTGAGGTCAATTAAGAGCTTTTATCATGAAAGCTTAAATCAGTGGAGTTGCCGGGAGCAGTGGCAAAATAGCAGTGTAGCCCT
GAGCCGAGCTGTTGACAAGTCATATCGGCCCTGGTGGATGGAGCTGAAAGCAAGTGAGAGTAACAGCCCAAGTTCTTGAAGCTTGAGA

TTTAGGTACTGTCTTAGATGGAAGTGGGCCAGGTGCTTGCTGGGGCTGCCTCCTGAAGGAGTCTCACACCAGTATAAGAAAAAG
AGAGGTTTACAGGCTCCAGGGATGTGCTTTTGTATATGACAGAAAAAGTCATGAGTATAAATTATGCATTAAATGAAGCTTTGAG
CTAACACTGTGAGAAATACGGTATTTACAATTGGAGAAAAATTTAGTAATGGAGGAAAAAGATGTTTGGGTAGCACTATTGTTCTTG
5 GCCTTCTGAGGAGGCAGAGAAAGGATGCTTACGGTCTCTTTTACTCCTGGAATTTCTTTTGTCTCTCTCTGGGAGACCATGCCATAAT
GTTTGTGGCAGAGATAAGTCACAGGTCAGGAATGTTTCAAGCTAGTTCACCCCTTAAAAAGTTCAATGTAGAAATCAGTGAACCATC
TATGGAAGAGATGCGACCCCTTCTGTCTCCATTGCTATGAATTTCTTTAAGAAAAAACCATGTTAATTGAACAAACGACTATGTA
TTAACCACTGTGCTCAAGTGTCTCCCTGCGAGCATCTCATTTAATCTGCATAAAAGCTGTATTTTATAATTCCTTGCATTAAGTA
10 ACTTGATGGAGATGACACAGCTTGTGACTAGGTCTGTGACAGCTGAGAACCCATTTTCTAACCATTAAGTTTACTGCCTCTTTT
TTCAAACTCTGATGAAGATGTATTCTCTCCCTAACCTATATTTTCTTGAATCTCTACATGAATTAATTTTTTGTCTTTTAAAG
CAATATCTCTCAAAATCTACACTGTCCCCAGCCATCATCAGGCGTGATCAAGAAAGTAAAGACATGTTTACTTTCAATACAGTAT
ATCCATTGTACAATTGATATCATATATGTCATATATATCATGATATCAACATATATAGATAGGTACTATATAGATACATAAAT
15 TGGTATATCAAAATGATACAATATGTCATTTGAAATCTTTTGTGAGAACTGTGTAGCAATAAATGTTAACATCTTTACAGGAAT
TACCTTTGACACAACAGAGTTTGAAGAAAAATAATTTACAAAGATGCTTAGTTCATCATTATCTGTGAATAGTAAATACCTTAAC
AATGCTATAAACTTGACAGGGGGCTTACAACAGAAGATGAAGCATATTATGATACATTATACAATAAAAAATGTATGCTGGTA
CTAAAAATGATTATGTAGATCTGTATTATCAGCATAGAAAGATGTCAGTGATACAGCAATTAAGTGAAGAAAGCAAAATACAAAGA
GCATGACAGATATAACCTTTTACCTGTAATTTTGGGTTTGGGTCATGGTCGATGCTAAGAGATATCCGGAAGGATATTCTC
CAAAATCTTAATAGCAGTTATGAGTGGTTGAGTTTGGGTAGTTTCTTATTCTTGGTACTTTTCTCTCTTTTATTATAATGAA
20 TGTGTGCCATTTTAAAAATCAGAAATTTAAAAATTAGGCTATTCTTTCATTGGGAGGGAACACATCAAGGAAATCCAGCACCC
TAACTGCTTGTCTTACCAGTACCGGTCGGCATGGCTAAGTTTGGGAGGCATATTGGAATTTGGGAGTCCAGCTCCATGCTGGTGT
TGATGCTGTAAAGACGACTGTTTGGGAGGCCAAGTGGGAGATCATGAGGTGAGGAGTCTGAGACCATCTGGCCACACAGTG
AAACCTCTGCTCTACTAAAAATGCAAAATTAGCCAGCGTGGTGGCGGCGCTGTAGTCCAGCTACTCGGGAGGATGAGGCA
GGAGAACGGCATGAACCTGGGAGGCGGAGCTTGCAGTGAGCTGAGATCACACCCTGCACTCCAGCCAAGGCAACAGAGTGAGACT
CCGTCTCAAAAAAAGAAATGAGTGTCTGCTACATAGGATGATGGTCTAGGTGACAACTGACAGCTGCTCTT
25 CAGCAGATGTCTTGTAGGAGCTATTCTCAGCAGCAGCTGCTTCTCTTGGAGCAGAAATGGGAGTCTCCCAAGTGGCTTTG
TGCAAGCTTCTCAGAGGTTTCTTACTCCCTCTTTTGAATCTAGTCTAGTCCCTGCTCTTAGGAGGGTGGGTGGGTCCACA
GTATAAAGGCCCTTTCAGATTGTGGGATATCTGTAGAGGTTTCCACTACGGGTCACATGATGGCTTGTGGAGGGAATAACAATCA
TAATAGTCATACTACCTTGTGATAAAATTTAGAATTAAGTGGGAATCAGAGATCTTCTAGGAGTCTTCCCACTTTTCAATG
AGGAACTGTAGGAGCGCCCAAGAACCCAACTCTTGCCTTCCACAGTCTGCTTTTGTTCATGCCACTTTGCTGAACAGAGCTT
TACTAGGCGAGTGTACATAAGGCCATTTGCAAGGTGGGCCAAGAGCAGGCCATTAACAGAACCTTGAATGCTTACAGAC
30 TCATCAGCTCCAGAACATACGGCTATACATGAGACAGAAAGAGAGTGAAGTCCAACTTGACAGGGGCTGAAGTGTAAATGTTCT
TTGTTTAAAGAGATTTTAAAGTGTAAATCCAAATTTAGAAAGGCGAGTGACATATTGGGGAATAATTTGTCATCAAAATTAAGAAA
TGAAGGTTAATATTATGCTACAGAAAGAACTCTTATAAAGCAAAACATCAGGACTCCAATAGACAAGTGGGCGAGAGCAATGA
ACAGAAAGCTTACATAATATTTTCTACCAAAATGAAATACCTAATTTCTATTCTGATTATGAAAAAGTACACACTAAGGC
AGGGTTCTCAACCCAGTGGAACTGATCTCGAGTCCGATAATTTCTTGTGTGGGATTTGCTCTGTGCTTGTAAATGTA
35 AATTTACCCACAAGATGCCAGTGAACACCCCTCACCTGCTTAGTTTGAACCAAAATATTCCAGAACCTTGCTAAATGTCC
CTGGAAGGCAAAATCAGTCTAGTTGAGAACGCTACACTAAGGAGAAAGACACATGGAAGTGTCTTCTCTCTTAATCTTGA
CAACTGTCAAACTAATACATGAATTAAGAGCCTTCACTCAAGTAAATTTGGCAACAAGTAAATTAATTAATTAATTAATTAAT
GCCAGTGAGGTTGTAGTGAATGGATAGAAGCATTGCTAGTGGTGACATTATATCTTGATATGACCCCTTTTCACTAATCTTC
TCAGGACTGGGAAGATTTGAATGCTCTTTCGCTCATTCTTCTTCTAGGAATTTCTCAAGGAAATCACTGAACAGAGACAA
40 AACCCAGTGTGATACAGATGTTCTCATCAGCATTTTATTAATAGTGACAAATTTGATAGCAACCAAGATGTGCACTTAAGA
CCACTTTAAGTAAATTTGTGATAATCAATTTGATGATGACGTCATTAAAAATTAATTTGACTATGTAGATGTGACAAAGTTATGAC
AGAAAGCAAAATACAAATTTGTATGTGACTATGATTGAAATTTTGTAAAAATAAGTATGATGTTTGTTCAAAGGATGAGATGGC
CAAGTGGGATGGTTTCTGCTGTAATCCCAATACATACGAGGCGCAAGGCGAGGAGTGAAGTGAACCAAGTGGGCAACAGAT
GAGATCTGTCTCTACAAATATAAAAAATAAAAAATAATAGCCAGGCGTGGTAGCTTGACCCAGCTACTTTAGAGGCTG
45 AGGTGGGAGATCACTTGAGCCAGGAGGTTGAGGCTGCAAGTGAAGCTGATTACATCACTGCACTCTGGAGTGGGTAATAGAGTG
AGCCCTGTGTCAACAAAAGGATGAGATCTCAATATGTGTAATGAAACAGCTGTATTAAGGAGTGAAGTATTAAGGAGTGGCGT
AATCTTTAAAAATATCTTTAATGTAGTTATCTGATTTTATTTTAAAGAAAACAGAAAGAAATGGCCAAATAGAGAGCTGA
AGGAACTCTGAGGAGCATCAAGTACAAAGAGACAATATTACTGAGCTCGAATTTGGGATCAGGTTTGGTAGGAGACTTATAAT
TTATACCCCAATAGGAATCTTCGAGAGTGAAGATGGAATTTGTAATATTACACAGGAAAAACAGGTGTCCTCACTAATGTCT
50 GGTCACTCTAGACAGGGAACCAAGAAAGATGACATGAAGCTCTTATGAAATCAGAAAGTGAATAAGTTAGAGTCACTAGAGG
GGACTGGATTCTATGACCAAAATGTGATTTCTGCACTGAGGACCTGTAACTAAAAAGGGTACTCAGCTGGCATAAGAATAT
GTCTTATCATTAAGAGAGTAGGATGACACAGAAATTAAGAGCAAGGCCATATTATCAGTACTAGAGCTGAGATCAGCGGAAGT
GATTCTACTCAACAAATTTTATCAGCCAGGAACAGTTTCGTTCTAGGCACTGAGAATATTGACAGGCAAGATGTCAGGCTC
TCTGATTTACGAACCTTACAGTCAGTTGGAAGTCAAGCTGGAACCAAAATTAACACACTAATCATGACATGTAAAGTGCTTCA
55 AAGAAAGTGAATCATGCAATGTGGAAGTGTCTAAGGGACGGGATGGGGCAGCGATCAGGGGAGGCTCTCTGAGGCCCTGGAA
TTTGAGATCAAAAGGTGAATCAAGAGGAGACTGGAAGATCTGGGAGAGGGTGATCTCAGCCTAGAGAGCTTTGAGGCCAAGCTG
CGAGGCCAGGCAAGGTGAGAAAGTGTCTGTAAGTGGAGACCAAGTCAAGACCATAGGGAGTGAAGGAGGAACTCAGTAATA
ATGGCAATTTGATGGGCTGAGCAGTGGCTCACACTGTAATCCAGCACTTTGGGAGGCCGAGTTGGTTGGATCATTTGAGGCCA
60 GTCCCACTACTTTGGAGCTGAGGCGGAGATTGCTTAAAGTCAAGAGGTCAGGTTGCACTGAGTGTGTATAGCACCCTGCA
CTCCAGCCTGGGCAACAGGCAAGATCTGTCTTTAAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATA
AAATAAAATAAGGCAATTTGTCTGCTAGGAGCAGGAATCGATGGGCACTGTGGTGGGACCCAACTAATTCAAACCTGCTGG
GGGATTTCTCTGAACCTAACTCTGATCATAAGTTGAGAAGCATAGCACCTCACTAGGCTGTTTACCGTTTAAATGAGAGGGCA
AATGTAAGAACAAGCAATATTGTCTATTTTTCACATGTTCTTTGTTTAAATGACAGAGCCTGCCCTTTTCTAGAAATCA
65 ATCAGATATATTATCTACATGAACACACAGTCTCTTCTTCTGGTTGCTTATAAACTCTTTAAGGATATCAGTAGTTTCAAGGGC
TTGGCTTCTCACACTAGGCAAGTCTCTTTTGTGGGTATGAATGGAGAGAGGGTCAAAATTTGAACCTAGGGAATGGCAGCAGAA
GTTCTTAAAGTGGTTGAATTTGCTCACTCCAGCTGTTGGTTCAGTTTGGGGAATAAAGAGAGGTTTGAACCTAGGCTTTTGA
AAAAATGAATCTCTTGGATTCTTGGAAATATCCAGATTTACAAAGTAGAAGCTATTAAAGTGTGTTAGTGGTGGTTAATCACTC
TCTAGGAATCTCATGGACATCAGAGTTTACTCAGCTGACCTTCTCATAGGCACATCTCAGATTTTGGAAAAATTTAGGAATAT
70 TATAAGTTGGCAGTCAAGCAAGTGATTTGATCGAACCTTACTCTATGGCAGGCACTGCTCTGTCTGCTGAGAACAAACAGTGA
AGACAAATATAGCTCTGCCCTCACAGAGCTCAACATGTAATGGTAAGGAAACGAAACGGTTAAAGTTATAATTAATGAACAC
GAATAGATCCCTGAGCTCTGCCCTTCCATTATGTAATGAATGAACTGTGCTGGACTATTAGAATGTTTCCCACTTTAAGAAATAT
AATAGTAGTGCTTAAATGGACATTTTGTTTTAAAGAAATTTTAACTAGAAATAGTCTCCCACTCTTTAAATTTTAAATATT
75 ATACTATAAATGATAAAATAAAATACATATTAAATAAATGAAATATGTAATAAATAAATCTTTAAGGATATCAGTAGTTTCA
GGGGCTTGGCCTTTCACAACTGGGCAAGTCTCAAAATTTAATTTGTTTGAACCAAAATTTAATAAATCAAACTATATA

5 GTTATGTTATATTTTATTATTTTGGAGATAAGGTTTCTACTTTTCCAGGCTGGAGTGCAGTGGTGGGATCATGGCTGACTGCAG
CCTCCACCTCCCAGGCAAAATGATCCTCCACCTTGGCCTCCCAAATAGCTGGGACTACAGGTGTGTGCCACTATGCCTGGTTAA
CTTTTAAATTTTGTAAAGATTGGGTATCATTATGTTGCCAGGCTGGTCTCAAACCTCCGGGCTCAAATGACCCTCCTGCCAA
10 GAAGCCTCCCAAAGTGCTAGGATTACAGCACTGCACCTGGCCTTATGTTATTATTAAGGAATCCACTATGAACATGATTTTTT
GCCCATTTGGCTCACTTAGGAAGCATTTTAAAGTCTTGATGCTGCAACCACTCCAGAACAAATTAATTTGGAACCTCTGGGGGT
TGGCATCCAGGAATCCAGACTGTTTAAAGCTCTCCGGGTGCTGGCAGTGTGCACAGCCAGGTTGAGAATCAGAAGCAGTACATTT
GCAGCCTATCAGGTCTGTACCTGAATATGTGGAGTGAGTAAATGTGTGGAGTGAGCAGAATGTGTGGAGTGAGTGTGGGGCAAT
15 GTGTGGTAAGTACACAGATACTCTGTACATACAGTGGCTGATGGCTTAAACAAACAAACCGGCCAGGTGCGGTGGCTCACGC
CTGTAATCCCAACACTTTGGGAGCCGAGGCGGGTGGATCAGAGGTGAGAGATCGAGACCATCTGGCTAACACGGTGAAACCC
TGCTCTACTAAAAATACAAAAATTAGCCGGGCATGGTGGCGGGTGCCTAGTCCAGCTACTAGGGAGGTGAGGCAGGAGAA
TGGCATGAACCCGGGAGGCGGAGCTTGCAATGAGCCGAGATCGTGCCACTGCAGCTCCAGCCTGGGCGAGAGCAGCGTCT
CAAAAAACAAACAAACAAACAAACAACTATTCAAACCTTGCTTTGATGGCAGTTATTATTGTTTGTGTTTGGTTTGAACA
20 TTGATAATCTTGCTAGTGGTAACCTTTGTAACCTGAAGCATCAGTATCAGCCAAGATTGCATGCATTAGAGACAAAGTGAGAGACC
AGGCATCAATGAGGAATCAACAAATCATGGCCTACTTTCTCATGTAAACAAAGATTCAAAGTGGAGAGACAGGCTACAGCAA
GGAAGAACCAAGCTCCTCTCTAAGCAGCCATCCTCAGTATGAGGCTTTCATTCTCTAGGCTGTGAGATGGGTGGCCAGCTCT
15 CGGCATCAGTCTATGTTGAAGGAAGGAAGCCTTTGTCCTTATGAGCAGGCTGTGCTTTTGGTAGGAAGGAAGCTCTGCCTTCA
CCTCCCTCCCGCCATCAGGTACTTCTGCTTACGTATCTTTGGTCAGAATCTGTACATGGCTACCCCTAGCTACAAGGTAAAGT
AAGCTGGAATTTTTTTTTTTTTTTTTTTTTTTTATGCAATCTTTTCCAGTCTTTAGAGGAAGGCAAGGCAGAGGGGTTT
GGGATGGAAGCTGAATGAACCAACTATAGTTTTTTCATTTGAGGGCAATGAAATCATAGTCTTGAAACCAAGGACAGGGG
20 ATAGCCTTTTACCCCTGTGACTAGACAGGTCCCTGAGGGCAGGCTGATGTGGCCAATCTTCTGTAATGCAAGGTGCTTATGGC
CTTAGAGCTTCAGCTCTAAGACATGAAGTGAAGGTTCCCTCCAGAAATCACACAGTGCATTATTAGCGGCAAGATCTGTGGTTT
GTGATTCTTCTCTCTTTTATAAGGTGAGAGGCAGCAGTGTGGGTGAATTTCCCAAGGAATGGTGGGAGATGTGGGCTAGATCC
TCCCGCTGCTTGGGAAGAGTCTGACTTTTTCAGTGTGAAGCCTGTCCAGGAATGGCGGGCTCCACCTCTGCAATGTGAGCTACAG
25 GGCTGGTAAGTGTGAGGCTGAACATATATCTGGGTGTGAGGTAAGCTTGAACGCCACTTAAAGTGTAGGTGAGGAGCCAAAG
GTCAACCTGCCAATACATGATTACATGTCTGTGTGAGGAGAAATACACAGGACTATTTTCCACCTTCTGGAATTTGTGATTAGA
AAATGCAAGGAGAAGGCCAAGACACTAACTGGAGCTGGTAGGAGGAAGCCTCAGCCCTGCTCAGGCTGCTGCAGTACAGTCCCC
CAGGCGCCAGCTAGGAATGCGAGCTTGTCTTGGTCTTGTCTTCTTCCCTAATGGCTCCCGCGGGTGAAGGAGTCCGGGATTC
30 CCATCGTTGAAGCGCTCTGTGAGTGACCCCTCTAAGCCCTCCAGTAGGGGATTTCCAGAAATGTTCCACGCCCCAGGAAGC
CTCTTCTTAGCCACCCCAAGCTGTCTGCGTTTATGTTAGAGGTAGGTGGCATCAAATGACCCCAAGGTGAGGATTTGCGCT
AGGTGGGAAAAGAGGAAGATAAAATTTGAAAGCCACCGGGCTGAGGAATATCTCATAGGAGAGAAGTCTCAACAGTATAACG
35 TTTAAACAGACTTTAAAGCAAGAAAGATGGAGGCAAGACTCTGAAGCCAGAGTGCCTCAATTCAAGTACCGGTGCTGCAACT
TCCAGCTGCGTGATCTTGAGCCAGTGACTTAACTTCTCTGTTCTCTGTTTCTCTCTGTAACCGAGATAATATTTTCTA
CCACACAAGTTTGTGAAATATCAATGTAATGATAACCAAAATACTTAAAGAGTGATTGGCACACGGAAGTATTCAATAAA
40 GTTATGTTATTGGCCAGGCATGGATGATTACCGCTGAATCCAGAACTTTGGGAGGCTGAGGCGAGGATGATCTCGGCTCAG
AAGTTCAAAACAGCCTGCGCAACATGGTGAAACCCGCTCTCTACTAGAAATACAAAAGTTAGCCAAAGTGATTGGCGGGCAGCT
GTAAACCCAGCTACCCAGAGGCTGAGGTGGGGAGAATTGCTTGAACAGGAGGAGAGGTTGCGGTGAGCTGAGATTGCACCAC
TGACCTCCAGTCTGGGCAACAGAGAGAGACTCTGTCTCAAAATTAATAAACAATAAATGATAGTTAAGTTAACTTAACTGTGCC
45 TTTTTTAAAAAATTTGGTTTCTATCCACCTTTTCTGTATAAATGAGCCAGGTTACACCTTAGACCTATTAGATCAGAATCAGG
CATCAGGATGCTAAAGCTCCCGAGGGACCCAGTGTGTGGATGAGGTGAGAAATCATGTTTGGTCCAGTCTTTCCATTTTAA
AGTAGGCAACTTTAAGGCAAGAAAGATCGAGGTGAGGATCAGGATCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
50 CCGTGTAGGAGCTCAGCGTGTGATGATTGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
GAATATCTGGCCAGGTGACCCCTCTCATGAGCCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
GATCTGT
55 ATTTTTTTGTTTTTTGTTTTTTGTTTTTTGAGACAGAGTCTTGTCTCGGTTGCCAGGCTGAACATAATGGTAAATCTTGGCTC
ACTGCAACTCTGCTCCAGGTTCAAGTGATTCTCTGCTCAGCCTCCGGAGTGTGCTGGGACTACAGGATGCGCCACACGCGC
CGGCTAATTTTTGTATTTTTGTAGAGACAGGCTTCACTGCTGGCCAGGCTGGTCTTGAATTCCTGACTCAAGTCTGCTGCC
CACTCAGCCTCCCAAAGTGTGGGATTACAGCGGTGAGCCACAGCAGCTTGGCCAACTTTCTAGTGTCTCGGAGACCTTTGCC
60 ACTAAGTCTCCAGTCTCTCGGGGAGAGCAGTCAAGTGTGAGAGAGGAACACAGGGCCCGAGCCAAAGCCTGCTCTGCGCTCCC
TCGGGGCAATGAGTCTTTGCATCAAACTCAAAGTTTCTGAACCTCTGAGAAAACAGTGCTTGAAGTGAATCTATAGCACA
GCTGTCAACAGCCTGTGGTCAITTTGGAGGTATGTGGCATAGGTTTGTCCAGGCTCAGTGTGCTCATCTGATGATGAGTGGGA
70 TAATAACAGCTGACCTTCCCTATCCACAGAGCGTTATTGTGAGGAGTCTGATGGACCTGGATGAATCTGAATAGGAGAAAGA
TGGGTACATGGATGCCAAATGAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGGCTCAGG
CCTTGGCAGTGTCTCTCAGTGGGCGAGCCTTTCCAGGCGATGACTGCCCAAGGAGGCGAGGAGGAGGAGGAGGAGGAGGAGG
55 GGGACATGGAGGAGCAGGCGCCAGATCAGCCACTTCTCTGCAAGGGAAGTCAAACCTTCTCTCATAGGTGTGAGGCTGGCT
GCAGGCTCCCTGGGCTGGCAGGCGAGGTTTCTTGGGGCCCTAGCAGGAAGCACTTGTCTTCCAAAGTAAAGACAAGTTTCTTA
TCACTGGCGGTGGTTTTCTGGTTAGAGGCAGCAGGCGGTACAACTTTGCCCTAGAGCTCTGGATCTGCAAGCCAGGAGGG
GGAGGACAGCAGAGCTAGAGTGAGCTCAGCAGAGCTGTCTTGGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
60 CCTAGGCGGGGAGAGGTGAGAGTGGCCCTCCTTCTGCTCGGGGTTTGGCCAGGCTCTTCAAGGAGCAAGTTTACAGTAA
TGTGTCTACAGTGGAACTCTCAGAGGGGCGAAGAAAAGGCTAGAGGAAGGAGCCAGGACTCCCGCCCCAGTCTCCGCTCT
ACCAACACCCCTAGTCTCATCGTGTGCTTGTATCTTACCTTTCCGTTAAAGAGGGGATGCCCTCCTTCTGGGATGTGCCAGGAAT
ACCCAAATGGTAAATGAATGAGCCGCCACACTTGCAGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
65 AGGAGCCCCCAGGATGTGGGTTTAAAGATGATTGACAGTATAACGATTAACTCATTAGCTCAGCTCATGACCTGAGTGG
ATTGTTAGGGCAAAATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
CATGATCATGGCTCACTGCAGCCTCAACCCCTGGTGTCTCATAGCTAATTTTCTTTATTTTATTTTATTTTATTTTATTTTATTTT
70 AATAATGTTGCACAGGCTGGTCTTAACTCCTGGGCTCTCAGGAGGTAGAGGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
GCTCAGC
TTAAGTGTGCTTTTCAACTTGGCTGATCATTAGAATGACCTGTGGCACTAGTTAAAAATCCAAATTTCACTCCCTAGTGTCTAG
75 TCCCTAGGATTTAAAAAATTTTATTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
ACTTTGGGAGACCAAGGTGGGAGATCCCTGAGGTGAGGAGTTCAAGACAGCCTGGCCAACATGGTGAACCCCGTCTCTACTA

301

HUMAN SEQUENCE - HENA

HUMAN SEQUENCE - mRNA
CAAGAGAGAGAGAGAGGTGCAAGCCCCAAGCGAGCGACATGTCCCTTTGGGGAGCAGTCCCTCTGCACCCAGAGTGAGGAGGAC

GCAGGGGTGAGAGGTGGCTACAGGGCAGGCAGAGGAGGCACCTGTAGGGGGTGGTGGGCTGGTGGCCAGGAGAAGTCAGGAAGGG
AGCCCGAGCTGGTGACAAGAGAGCCCAGAGGTGCCTGGGGCTGAGTGTGAGAGCCCGGAAGATTTCAGCCATGCCTCACAGCTCCGA
CAGCAGTGACTCCAGCTTCAGCCGCTCTCCTCCCCCTGGCAAACAGGACTCATCTGATGATGTGAGAAGATTTCAGAGGAGGGAGA
5 AAAATCGTATTGCCGCCCAGAGAGCCGACAGAGGCAGACACAGAAGGCCGACACCTGCACCTGGAGAGCGAAGACTGGAGAAA
CAGAACGCGGCTCTACGCAAGGAGATCAAGCAGCTCACAGAGGAACTGAAGTACTTCACGTGCGTGCTGAACAGCCACGAGCCCT
GTGCTCGGTGCTGGCCGCCAGCAGCCCTCGCCCCCGAGGTGGTGTACAGCGCCACGCATTCCACCAACCTCATGTGAGCTCCC
CGCGCTTCAGCCCTGAGCTTCGATGCGGGGAGAGCAGAGCCTCGGGAGGGGCACACAGACTGTGGCAGAGCTGCCCCATCCCG
CAGAGGCCCTGTCCACCTGGAGACCCGAGACAGAGGCCTGGACAAGGAGTGAACACGGGAAGTGTACGACTGGAAGGGCGTGA
10 GGCCTCCAGCAGTGCCGAGCGTTTCGAGGGGCGTGTGCTGGACCCACCACTGTGGGTTGCAGGCCCAATGCAGAAGAGTATTA
AGAAAGATGCTCAAGTCCCATGGCACAGAGCAAGGCGGCAGGGAACGGTTATTTTCTAAATAAA

HUMAN SEQUENCE - CODING

ATGCCTCACAGCTCCGACAGCAGTGACTCCAGCTTCAGCCGCTCTCCTCCCCCTGGCAAACAGGACTCATCTGATGATGTGAGAAG
AGTTCAGAGGAGGGAGAAAAATCGTATTGCCGCCCAGAGAGCCGACAGAGGCAGACACAGAAGGCCGACACCTGCACCTGGAGA
15 GCGAAGACCTGGAGAAACAGAACGCGGCTCTACGCAAGGAGATCAAGCAGCTCACAGAGGAAGTGAAGTACTTCACGTGCGTGCTG
AACAGCCACGAGCCCTGTGCTCGGTGCTGGCCGCCAGCAGCCCTCGCCCCCGAGGTGGTGTACAGGCGCCACGCATTCCACCA
ACCTCATGTGAGCTCCCGCGCTTCAGCCCTGA

MOUSE NOMENCLATURE
ICSGNM Irf4
Celera mCG4922

HUMAN NOMENCLATURE
HGNC IRF4
Celera hCG20902

ATGCTCATCATCTCTGAGGGGCACACCTCCCTTGCTTTTGGCCCTCTGAATCACAGCCTTGTCCTCTCTCAGCATGTCTCTATCTTTCC
ATATTTTACACCTCTATCCAGGCTGGTTTGTGCAAAATTTGGCTGCCTAAAAATCCAGCTCGAGCTGTATCACTTGTAAAGGATAAACT
ACTAATATATATGCTTGCCTGTCTCTTTCACTCATGAATGAACAGCTCTCACACTCTATCTCCCTTAATATCTAACACAGAGATGC
AGCTCCCAAACCTCTACAGCCTGAATCCAGAGCCTGAGCTAGCCACGAATGCATCCAATCCCTGTGGTGCAGAAGAACCCATGCT
15 GTTGTCCAAATCAATCACTAAACCGTTTAGAATTTCTCTGTGGTCTCTCTCTTCTCAGTGTGCTAGGCTCTCCACCCCTCACTCTGACT
CTTTTCTTCTCTACTAGACTCCGCTGTCTAATCTCTAAGATTTCTCAACATTTCTAGTGTGTAACCTAGCCTTGTCTTCTCTCTCAT
GTCTTATATTGAAATTTCTGTGACTCTGAGGTTCAGAACAGAAGTCTTCTGTCTGGGGTTGCCTATGGTTCTCTCAATCATTTCCAC
TCCTTCCCTCATCTGGTATTTCCAGAGAATGATACCTTTTGGGACAGTGAATATATACCCAGTACTAAGCTGAGTCACTGCTCA
GCATACTCTTTAGAGCAACCTGGGCTTGGCCGCTCATTTGCCCTTTCTGTGCTCTCAGGAGATGAATAAATCTACAGGAC
20 TTTGGAGAACGTCACAGTGGTTCATGCAAGTTGACCTTGTAGCTTGTAGCTTTGGGTCTCAGAGTGCCAGAGCAAGGGAAGATAGAG
CACAAAGATGTGGAGATGTGGAGTCACAGCAACAGTGTACCAATTTCTAGAATCTATAGTTGCAAGCACTACTCTGTCTGAAGGCAG
TTGAATACAGAGAACATATCACTATGGCCTTTGGAGCAATGCTCAACACACCCAGCGGAGGACACTTTGCAGAGCAGGACAGTGG
GAAGCAGAGAGGTTTGCCTGGACTTGGGAAGGATGCCTCGTAGCACAAAGAGAAGGAGAGTGTATGAAGGGCAGGCTGGATC
TTCCACACAAAGATGTAGGGGCACAGCTTACTTGTCTTTAAAGGCTGCGCAGCACAGTAGAGTCCACATGCCCTGGAAAGTCAATGT
25 TTCTTCTTAGGTTATATTGTGGCATCTGGGATGCTTTCTCTGCTGCGGACAGTGAAGAACAGTAGAGTGTCTCTCTGTTAATT
TTAAGTTTCTCATGTATGTGAATATACCCCCACCCCGAGGTGCTGAGTTCTACTCAATAAAGAGGGGCTAAATTTAAACAT
ATTTAAAGTCAACACATTAAGTTTCCAACGTTCTGTGTAGCTCAATCCCTCTAAGCATGCCTATCTGCAACCAAGAAATCTCATT
GTTTGTGATCTGAACACATCACTCAGGAGCTACAGTGCACCATGCTGTTCTAGGCTTAGCAGAGTGTATCTGGTGAAGAGTCTGC
TAAGAATACTCGCTGCGCTGGCCCTCAGGGGCTTTTCTCTGTGTGACTGGTTCTTTTATGTCTAGCGAATATATCAAAATAGAA
30 CAATATATCTGTAATCAACAGTAGTCAAGCCTGTGTACTTATGCAAGAGGAACTGCCTTTGGATCATGAGTTTGTAAAGAGTTGA
GGGAGAGGACAGTGTTTAGATCAGAAGGTGATCTCCAGATGACGTTTATACAGAGCTGGTGTAGTCTGAGCTGAGGAGGGGCGAG
GTTTCTTCACTGTGCTGAAGACTTCAAAGGCTGGGCAAGAGACCTTTATAAGAAAGTGCTTCTCAAGGCACTGAGAGAAATA
GTACAAGGAGACCCGGAAGGTAGAGAAAGAGGAAAGGAGAACAGACTGGCTCACATGCTCAGAAGTGAGGACGACTCCATCTCACA
GGGAGTGCAAGGCTGTTTGAACCAAGTTTGTGCAATCTACTCTCTGTGGTGGGCTACTGATATGAACCAACCAACATTTTAT
35 ATAAAGTCAATCTAAATCACTGTTCTTTAGAGATTTGCCAAATGTTTGTATGTCTGCAAACTAAAAATTTGAATGTTCCAAAC
ATGACCTATGTTTATGCTTACAACCTCCATTAGTACTTTCACTCAGTCTTTAACGTTTGTATACTGTAAAAATCTGTCTTAAAT
TGAATGCCCCCAACATGAGCTCTGCCCGTGCCCATAGCAACATTAACACTGCGCACTCTGTCTTTCAGAATTTCAAAGCTTGTAGAC
AGAATGCTCTGAGGAACATCAAAATGCAAGAGTGTAGTAGTACCTGGCTTCTCTGTAGTAGCTTTAAGGGAGACAAACAGCAC
CCTTTGTAGGACTCCATAATGTGTTTACTTACTCTGTGGACATGGAAACAACTCAGTAGTGGGGCTAGGGACAAACACAGATG
40 GGGCTGAAACCTCCTCTGAGAAGGGACAAGTGGAAAGGAGACACAGATGCTCGAATATACATTAGTTTCTCTGTGAAAGAA
GTGGTCAATGTGGGTTGCAAGTAGGGCAAGGCAATGTGTAATGTGAACCATGAGGTTAATAAACCAAGGGGACATAATCTCTTAA
GCGCTAGTCTGTCTACTTGGCTGGGCTCTCTCAAGGACAAGATGAGTCTGAGGAGAGGAACAAATGAGGTGAGACAGGGGATCCC
ATCCTGGGGGTCAACCAAGGGAGGTTACATCAGCAGGCCAAAGCTCTAGAAACACAGGACACCTCTAAGTGTGGGGTCAAGGCTGT
CCTCAATCCCAACTGTTTTCATGGCCATCTGGGCAAGTCCAGGTGACCTCCCTGATGCCACCATCTCTTTTGAATAAGACCA
45 TCGTCTGCGCTCCTGTTCCCTACCTGTTCATAAAGAAGTATTGAGAAACTGTAGTCTGGTACAGTCAACTCTCTTTGGAGT
AGCAGACATGAAGCCATTGTCTGCAAGCTGCCACTGAGCTGAGGGCTGGGCTAACCTGGGATTTTCTCTACCGTGCCAGGCTG
GAGGAGTTTCAGTACTCTTCAACAGAGTTCTACTACTAGGTGGTTTCTCATATGTTAGTTCTCTTGGCCCTCTCTGACTAGCTCAT
CTGTGCTACTGTGTGGAGATCTTGCACAAATCTCAGGAGGGTGCATGATCTCACCAGTACATGTGATCTCTGTGACTGACTCAC
TGGCTTATTGCATTATGGATAAAAGCACACGAGACACGCATGCATCAAAACATTGTACAGCTCCCGAGTAGTACACAAATTGTTA
50 TGTGTGGGGCTTTTAAATCACTTAAAGAGTAAGTTTAAATGAAACAGCTTGATCCCTTAATGTGGGAAAGAGCTTGTGCTTATT
TGAATGACATGAGAGTCAAGCTGTTTGGATCGAAGAACCATCTCTTGGCTCTCTCTGCTCTGCTCAGCAGAACCAAGAGGCTCA
AGAGACCCGTTTCTGTGTGCTCAGGTCATCAGATACAAGCAACGAAAGTTCTAATGCAACTGTGAAAGTTTCTCTTTTGTCCCT
TGTGTAGGATAATCTGCATTAAACAACTGCTCAAGATGTTGAAAAGGAGATGTGGGGGAGAGGGGAGTGAGACAGAGGGGAG
GGAAGCAAGCAGGTGAATCTACACAGAAATGAAGAAGTGAAGAAATCCCTGCACTGCATGCCCTGTGTGAGTGACCTGCTCT
55 CATGAGTCAGGAGGAAACAGCGCTCAGGTGGCCCTGGGATGAAGGGCTCTTCTTTGCTGTCAGAGGGAATGCCCTTCCAGGGGC
CCTCAGCTCTTTCTATGATGAAAGGATAGTAAGGCTTCTCTTCTGCAAGTCAACAGTGTCTCAGATTCTGCACTCTGCCACTTCC
CATCTCTGCTGCTCACAGAGACAACAGGCAAGGTCAGGGACTAGTGGCTAGGCTGTGCTGTGCTATGATAGAGGCTCT
TACAAAAAGGACTCAACAGTACAGATGTCTCCAAATACCTTAGTATGATATATCTTTAAAAAAACATATATGTCATGAAAAAT
GATACACATCATTAAATATCTCTTCAAATCTGGAAGCAGGCAAGTATTGTTTATACATGCAAGGCGCCATGGGGACCCACTT
60 GGAGACCCTTAGTCTTGTGTTGGCAGTTGTATGGGCAACTCTAAGGTAAATGGAATTTTGAACAGAGGGCTTGATGGAGCAG
CAATTCAAGTTTCATCAGGCAAAAGCTTGTGTTGTGATGCTCTGGTTGAGCAAGGAGGAGGCAATCTACTAGCCACTTTTCA
TGGTCTCCTTAAATGCCTGAACCAAG
GGAGAGAAAGAGAGGAGGAGAGAGGAGGAG
ATGTATATCTGGGTGCTGTGATTGAAATCATATTAATGTATATATGATATGATATCAATATATATATATATATATATATATATATGTA
65 TATACGTATATGATGTATGATATATATGTGTATATATGTGTATATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTAT
GTGTGATGTGTGATGTGTGATGTGTGATGTGTGATGTATATGATATGATATGATATGATATGATATGATATGATATGATATGATATGAT
AATCTAGTGAAGAGTTGTTTCTGTAATCATAGCATGACACAGGACCTGTGGTGATACAAACAAAGCAGTGTCAATGAAGCTT
TCTTTTGTATAAGTCCCTCTTCTACTAAGAAGCTTGTAGGACTCCAGCCAACTTCTAAAGACCCACCCCTACCAATGCAATTTCA
ACTGAGGAATTAATTTGCTAACCCAACTCTGAGGAGAGAAACATTCAAACATCAGTATCTGATAAACATTTGATCCTCAGACAA
70 AAGAGTTTCCATATTAATCTGGAGCATCTTAACTGTAACATTTATACCAATTTATCAGAAAAAAATCCAAATATATTTCTGA
ATACAGCCTTTTATGTACCAACTGCGCAACCTGCTCAGGATAGAGGTAGGCAGGATGCTAAGGCGCGCGCCCTCGAAGG
TGTAACAGAAGTGGATCAAGCAGAACAGGACACAGACTTTGGAGGACATCTCATGATAGCCAGATTTGTTTGGAGAGAGTGA
TAGCTCAGACCTTTTGGATATAAGACATCAACCCATCATGTGAGCCCTCAACTCTGAGTCACACTCTCTCTGTAAGAGTCTGGGA
AGTAGATTCCCAAGGTCACCTTTCTAATTTCTGCACCTGATCTTCCCAACCCATCATTGGGCTCAGGCGCTCTCTTCTAC

GTCTCTGTTTCCACCTCCTGCTCTGTGTGAGAACGTGTCTCTCTCTGTGGACTCTCCAGGACTCTGGTCATTCTCTCTGTCT
GACACGGCCACACACAGCCAGATATCTCTCTTGGCTGGGGCTTTCTATCTCTCAACAGTGATGTGTCTCTGGCGCTGTGAATA
ACTGATAAATGGCTGCAACAATAGCCAGGTGATGTTTCTCTGTAATCTCTTCTTGTGACTGTGAATCAAGCATGGCCAGACTAA
CCGCTCCTGAGTAGCCCATAGGAACAAGAAGGCCTCACACCCGAGCCTCAGGTTGACCATAAAGCAATGCAACTTCCCTGAGAC
5 ATAAATCTCTACCGCCCGGTGTGCCACGATCATCTCTGTGTTTACAGTGTTCTGTCTGAAAAGAAACATAGCAGATACAGTTTAG
AATAATCTCAGAGCGAAGCGAGTGTGCCAATGGGTGCAATAGACAGTGCCATTGGTCCCTTCACTCTTGCTCAGTTTTCGAAA
TTGTCCCCAGTGATTACAGAGTATTTGCATTTTTTGTGTGGCTTGGGAACGGGAATTGGCAGCATCAAGTGTTTCTTGCTTAGAGCC
ACGTCACTATTACGTAGCAAACTTACAAGTCAGAGAACCGGAGCATTAGCGGAAACTCTTATAGATGCTCAACAATCAAGGAGA
CAAAAAGGGAACAGTGGTGTGTTTATAAATATGACGAAGGAAGGAACAATGTTGCTAGAGTCACAGACTTGTGACTCCT
10 TATTACATGATGATAGAAATGACAAGTCTCATCTTCTATAGAGTTGAATGTGGTTTTTTTTTCTTACCATATGCAATGTGACTCTGG
TATTAAATGTGTTCCCAACAACTTCTCTCAATGGCTGATGATCTGGGGATGTTTGATAGTGGAAATGTCTGAAGTCACAAAACAC
TTAGAGGATTTTTGCAATTTAGTTAAGGTATATTCGGGACCTTATATAAAATAAAGTTGATTTGTTGGCCCAAAATACATCA
TTTACTAATAATGTTAGTTTGTAGTCTTGGGATCCATGCCAGCTTTTTACATAGGAGCTGAGAATTGAACTCAGGCTTTTAG
CTTGACAGAGTAAGCACTCTTACCAACTAAGCCATCTCCCATACCCCTGACTTTAAACCAAAGGTGGAGCAAAATAGATGATGATGAT
15 GTTAAAGAGGCTTCAACAAAGCTTACTTCTTGGGCAAGTCACAGTGTAGGTGGCTCTCTGGATCTCTCTTCTATGTGTCAC
AATTGGACTAAATGCGTGTGCCCTTGAACACCATACAGGTACATTTGAAGGGTGATATCATATGTTCTGTGACAGTCTCCAAGGGC
TAATGTAGGATATACGTAATCATAGTCTAAGTGGGTGAGCACTTGCATGACATAAATTTGTGTGAGAGCACTGCAGAAAGCAG
GGTCACCGCACTCTTGAACGTGGGAAAGTGAATCACCCACCGCTCTACCCCTGTGAACCTCTAGACACCTCTCTCTGCTCAT
20 GTATCATGAAGTGGTGTGACGGGCTCAGTGGGGGTAGTCCATGACCTGGAATCAAGAACTCAGAGGTTTGTCTCGTTTTTA
AATCAGAGGCAATGCAATTAACAAACAAAGTTTTTTCTTCTGTTTTATTTTTTAATGTTTTATAAAATAATTTTTCCCAAAGA
TAGAATTTTACTTAAAAACAAAACAAAACAAAACAAAACAAATGTAGTTCTCATTTTAAAGAGTGAGGTCATCAGAAAAATACAT
TTATCCAAAGCAAGGCTCTCGCTCTCTTGAAGAGAGAGTACTGGGAATTGAAACCGAGTCCCTCCACACAAGACAGCACTTTCTA
TGCCACCGGTACACCTTAGCTGAATATGTCTTCTGAGTATCTAACCTGACTGGCTCTATAAACCACTGTGTTCTTACTTGTGA
25 ATGTATATTTTTAAAGGTCAATTTCTAAAATACTGAGCTGCAGTCTAGCTTTTCTTACCGCTCTTTTATGGGAAGTATGAATGAA
AAGTTTGGCCCCCTCAGACCTCGATCACTGCTCAGTGGCTCCTTAGCCCAATAAATAGTAATCTCTCTGGGAGTATGGAGCTC
TGCTTTTGGAGCGGATGCTCAATCTACTAATTTCTGTGACATTTTCAACAAACAGTCCGCATCTCAGTGTGACATGTATGAT
TTTCTTAAGTGTGAGTGCAGAAAGAGGATGGGAAATGCTTACTGGCAAAATGTGCCCATTTCTTCAAGTCTGAGTGTGATTTAAG
AAGTTCTTAGTGGTCAGCTAGAAGGGGGCAGCTGGCCATCTCTCTCTCCACGCAACATGGGAGCATGTGATTTCAAGGGA
30 ATACATTTCAACTAAAAAGAGAAACCGGGATGCTGTTTGAAGGAACGGTTGAACTGGAATCAATATGTGCTGTGGTGTGAA
ATAAATGTGTGCTCAGATGTTTTCCATGCTGGGGGACGGGTGAAGAAAGTAAAGGCAGACTGGTTAAAGACATGGGTGGGGA
GGGCTGGAGGAGCAAGTGTGAAGAAATGGGACAGAGGAGATGAAGGTGTCATAATGAAGAAACCATCTGCTGTGCACTA
ATAGATGCTAATAAATAGGAAGTTTTAATGATTAGGTAGTCTATTGCTGCACTTCACTCTGTAACATCACTTCTGGGG
GATCCACACAACGAGCGAGTAGTAACCCAGAAGATGGCGTTGAAGATTAGTAATCATATCTTTTAAACAAGATAACCATGTGAAG
35 TCTCAAAAGGTTTCTGTAAATGACTGTTGTTTAAACTCTGAAAAACAGAGGATGTAGATTGGCTGAGGAAAAATGTGAACCCGCT
AAGTCAAGGTAGAAGACAGCTGTGTTCTAAGTGAAGAAAAAGAAAAAGAAAAACCAAAACCTCGGGTTGGCTGCTCTC
TGCTCTTAGTCTGTGACAGTTTGAAGAAATGTGAATCTCCAGAGCAAGGCTGTGCTATGGAAGTACAATCTCTGTTTGTGCTC
CGAGGTGTGTTCTGTGTGACCGGATAGTCTCCGACAGACAGAAGGTGTTCAAGAAATATTTTTGAATGAATGAACCCCAAGGA
40 AGAAGAGGGGAAATGGGTGTGACCAAAATTTCTTGAACGAACCTGTGTTTACTTACCGGGCTCTGCAATAGGAAGATAA
TTGGGGTGAAGAAACGATGCTGCTCTGTTAATTTCTGAGAAAGCGTGTGATGTTAGGAAAAAAGAACTGCGGTGGGCACTC
CTGCACCAAGTTTCTGTGGCCAAAATCAGATGTTTCTCCTAAGTTCAGAACCCAGGATGGAAGATTAAAGAAAAAAGTGAAGAA
CATGTGAAATGAAAAAGTTGTCAAACTTTTACAAACGCTTCAAGTTGACCTGTGGTGGTGAATCTAAAATGATACAGAAATG
45 TAGTCTGCTTGTCTTACCTGAAAAACACAGATAAATATAGAGCTCAGGCATCAAGCTGAGCTGGAAGATGACCGGCAAAAGC
TCATGGAGTTTACATATGAAGGTCAAAGAAAAACAGAAAATAAAGTAAAACTTCAGTCAGCTAGCTGTTCTATTGGGGCAATG
GTACCTCACCGGCAAGTCTCTCCACAGGCTGAGGTAAAAATTACATTTAAGGTGAATGACATCCGGAAGCGGCTAACTAC
CTAGACTCAGGATCCCCATCTCTTTATGTTGCCATGATTGAACATTTGGGAGTGTGCTGTGTGATGATCATCTCAATTCGT
CGGTTTCATTCCCAACCATGTATTAAGCGTTTCAACACAGTATTTGGGCCACGGCTTATAAATCTGCCTTTCTATTTTCTTTT
50 AGTGAGCGTGATATTTCTTAAACGCTCAGAGACAGCAAGACTCCGCTTGGCCAGGATGCTCCGACCTCTCTGATCTATCTCT
CTGTACATGCTGTGAGAACCAAGTTCTCTGTGCTCCAGACTCTCATCACTTCCCACTGGCCATGAGCACTAGTATGATATCA
GCTATGCTCAGTGAGATTTCAAGTATCCCTTTGATGCTCTCCACCTTACAGGAACGGGCAATACCGATGTGCCATCCGGTTG
AGGATTTCTGAGTACATCAGATGCTCCCAAGCCCCCTCCACAGGAGGAGCTGAAGAAAGCCAGGGTTGTCTGAAGTGGGACAGCCCT
TGACCCGGTGGGCTCTAGTCCGAAGCTCCTGTTCTGTGGGACACCCAGGCCACAAGGCAGAGTGGGGGGCGGTCTGGGTATGGG
55 CAGGCAAGCCCTCTCAAGGCGGGGCGAAGCGCCCGCTGCACTCGCGCTCGGCTCTATAAAGTCTCTTTCTTCTCACTCACT
TTCTAGTTTACCACITGAACTTGGGACCTTTGTGCGCTCAGCTAAGATGTGCGGTTGAGGTAAAGGCTGTAGTGGGCGAGAAG
GAGGAGTGTGAGGCTGTGGGACGAGGAAGCTGGGCTTCATCTCTGAGGCTGAGGAGAGTCTGAGATAGCGGACCGAGGCTCCG
CTCATCTACGCTGCCCTAGGAGCTGTGCACTTCGGGTTTTGATGAAGCTGTTTGGGTGGGAGTTCAGAAACATCCCCACGGCT
GGGCGGACGAGCTAATGGGACTGTGGTGTATCAAGGATCGACTGGCCACAGCTTGTCTCTCAGAGGGACAGCCTCTGACTCTC
60 TGTGCTCCAGTGAAGCTCTTTCACGCGCTGGTCTTAAAGGACCCAACTCATCTAGGGCTCCAGGCTGTGATCTTAGGCGG
GGCAGCCAGAAGAGCTGAGAGCTCCAACATTTAGGCTCTCAGAGCCCTTTCCCGCATGGCCCTTCTCACTTCTCTGCGAAGA
GTGCTAGTGTGTGCTGTCGCGAGCACCCCTTATTTCCAGCCTCGGCTTATTCTGCGCAGGGTTACGCTGACATTTCTGAGGTTG
AATCTCTGTTTTCTTGGCTCGCTGCTTGGCCCCATAACAGACTTCCATCTGTTGCTTCAGGACCAAGCTAGTGTTCTGTGTTG
GGTAGGCTGGGTTATTCTGAGGACAAAGTAAGGTTGATAGAAGAAAGTCAAGAGATAGCTAGTACCGCAAACTGTCATG
70 CAGGGACAGGACCTGGACAGGCTAGTCCCTGACAGGCTCTTTTCGCTGGGGCAGCCAGGGAACCTAAACCCAGGAG
GGGCAAGTGTAGAAACAGTGAAGGAAAAGTGGGATGAAGCTACTTGGATCCAGACAGAGGACAGATGAGCAAAAGTGAAGCGCC
CAGGCTGGCGCAAGCTTGGGATCTGCAGAGAAAGCTGTGTAGCTAGGAGCTTTCAACGGAGCTGTTAATGTAATGTAAATGAAG
65 AAATTTGCTTAATTTTTTAAATAAAGAAAGACAGACAGGCAAAAAAAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
GCCAAGGATGCTCTATACCTTCGTCAAAGTACCTTCTCTTGGGGGACTTCGGAAGACTCTGGCACTGCACCCGAGACCTTGG
CAGCTCAGAGACTCGGGGCTCTGTGGGCACTGCAAGAGTTTGGGACGGGCTTCTCCGCTCCAAAGTGAATGCGAAGGTAGTT
GCAGGGAATGTGTGCTCTCTCAGCGCAACAGCCAGGAGGAGTTCGCGAGCTGATGAACCTGGAGACGGGCAAGCCGGGCTC
AGAGTTTCGGCATGAGCGCAGTGAAGTGTGCGGCAATGGGAACTCCGACAGTGGTTGATCGACCAGATCGACAGCGGCAAGTACCCG
70 GGTGTTGTGGGGAACGAGGAGAGAGGCTCTCCGCACTCCGCTGGAAACACCGCGCAAGGAGGACTCAATCTGTAAGGAGGAC
GCTGCGCTCTCAAGGTTAGCAGCTTACGGATCCGCTGGGCGAGGTTGGGGTGGGATGGGGAATCGAAAGCTGTAATGTTCT
GTGCTCCCGGCAAGGACTAAGAGTTGGGCTCTGCAAGGAGGAGGCGCAGAGCATCAAGCATTGGACCTGCTTAGGCAAGATC
CCCAGGAGAGGGAAGAGGTTGCAAACTCTCCGGGATGTCATACAGAAAGACAGGTCGCAATCTGTTGTGTGGAGGAAAG
AATTTCCAGCTTACCGGCTCTCTGCGGACCGAGCTTCCGTTTGTGATAGGTCATGCTTCTCTGCGCACCCAGCAGCTGCT
75 TAGGCGCACTCTGCTCTCTGCTCTGCTGTTTGTATTTTTCTGAGTTTCTCTCTGCGGTTTTGTTTCTTGTATGGGCA

306

307

308

5 GTCATGTTTTATCAGCAATAGAAACCTAACTAAGACTTCATAAACTAAGAGTCAAAGGATAGAAATCAATCTACTAAGCAAAT
GGAGCTAAAAACAACTGTTAGAACCATCTTCATACCTGATAAAGTTGAGTTGAAACCTTCAAACCAAAATAGCCAGAGAGAT
AAATCAGATCACTGTAACTGTTACTGAAAGGACAATCTTCAGGAGCAAAATAGAGAGACACTACCACAATCTCTAGATCTGATA
AACATTTTATGCAAAATTAAGTGTATACAAAGCAACATGCAAAACCAAAACCAAAACCGCATAGCTTTTAAACATATAAAAA
10 CAAGAGATGACCTAAGAAAGAGAAATAGGATACTACACAAAAATACTAGGGCTCATGTTTCATTAAGAAACCTTAAATGACACA
AAAAACCGATCCAGGTACAACAATAGTGGAGATGTCAATAATCCCACTCAAATCTTTTTTGTGTTGGTTGGTTGGTTGGTT
TGCCAGATAGGGTTTACCATGAAGTCTTGCCGAGCTATAACTTGCTATTTCGATCAGACTGGCCTCAAACCTACAAAGGTCACAG
15 GTTAGGGTTAGGGTTAAGTTCTCCTGCTCTGCTCTGGATGCTGAGATTAAAGACTGTGACCATGTCTAGTCTCATCTCTTAGA
TAGGTCTCTGGGATGGTCAGCTTTAATTGCCAACCTAATAAAGTCTAGGGTCAACATGACCTGAGAGGAGAGTCCAGATGAGTGAC
TGTCACATGGAGTGTCAACAACCTTTGGGCAAGCCTGTAGAGAATATCTTATGTAAGTTAATTGATGTAGGAAGACCCAGCCCACT
GTAAGTGGTACCATCCCCTTGCGAGGGTTCTGATCTGTTAAGAGTGGGAAATGAGCTGAGAACCAGCAGGTATGTTGTCATTTC
ATTTTCTCTCCCCTCACTGTAGTTTAAATTGACTTGCTGTTGAGTTGTTGTTGCTTGGCTCTCCCAAAATGATGGAGTCAACCC
TAGAATTTAAGCTGAAATACAAACCTTTCTCTCTAAGTGGTTGTGTGTGAGAGAGGGAGAGAGACAGAGACGGGACACACAC
ACACTCAGAGAGGGGGAGAGAGAGGGGAGAGAGGGGAGAGAGGGGAGAGAGGGGATTTTAAATTAAGAGAACCAAAAT
20 GAAACTAGGAGTTTCAAACCTAAAGTAAGCAAAAAAATTCACAATTAACATGTGAGGTATCAACTGGACTTAAGAGGTATCA
AACAGACTGGTCCATCTAAAGATACAAAGTATACATTATTTCTCCTTAGCCATAGAACTCTTTTAAACTAACTGAACTCTGTT
GCCTACCTGTGGATCTGTTCTCTAAGTGGCTGCTTGTCTGCTCAGTGGGAGAGGATGTGCAGTATGATGTGCTGAGG
TGCGGTGATATCCAGAGCGGCTCTCCCTATTAGAGGAGGAATAGGGAAGGGGCTATGTGAGGAGGGGCTGGGAGGAAGGGAGGC
25 TGTGGTCAGAAATGTAAGTGAATGAATAAATTAATGAAATAAAACAAACCAAGACACCGCATTATAAACCAACAAACACA
ATCCTTATCCATCAAGGAACATTGAAAAAGCTTGCACTGCATTATACCATAGTAGAATAAACTAAATTAAGTAACAGCA
ACAAACCAACACACACTTAGGAAAGTGAACATGAGTCAATTAAGAGCAAGGGAAGAAAAATTCATCCCTAGAGTCAGAT
GAAAGAACTGCTCACTTAGAATCTCTGTCGACATCTAAGGCATTCTGCAAGGAAGGTGATGGTCATATGTTTATATTA
GCAAAAGTATCAGGTAGACCTCAATACATAATTAATAATGGGGGGGGAGAGGGAGAGAGAGAGAGACCAATTTGTATG
30 CAGAAGATTGCAAGAAATAAAGAGAGAGTCAAGATCAATTAAGTGGAGACTAAGAGAGCAATGTCATCAGGTGAGAGTAA
TGGTATTGAAGAGATAAACAAGTTGATAATCTTGCAGAGCAAAAGGAGAAAACTCTCAGATGAAGAAAGTGAAGAACAAAGCA
TGGGATCACTAGGGAATCTTTGAAATTAATTTCAAACCTCAGAAGTCCAGAGGAATGGATACATTTCTAAACACATATGGTC
TGCTAGAGTTAAATCAGGAAATACAGACGATCACTGCACTCAAAATAACCAAAATACCAACAGCTGTTGAAGCAGTAACTAA
AAATCTCCACACAAAGAAAGTCTCAAACAGATAGATTCACTGCTTAATCTACCAACCTCTTAATGAAGATTTAACAGAACTACT
CTTAAATAGATTACCAATAAAGAGAGAGAACAGACCAAGTCATTACACAAAGCAATAAATCTGATTCAGAGCCCAAC
35 GAAAGATACAAACAAACAACTGAAACCTGAGACCACTCTCTTAAAGATTCACAAGCTCTTTAAGCGCTCACTTCTCTTCT
TCTAGCT
TCTAGCT
TAAAGCTCTAAACCAAAACCAAAAAAAGCACTTCAACCAAAATCTTGAACCAAAATTCAGAATCCATAGACATGATCTTA
ATCGAGTTACTTTCTCTCAGGAAAGCATGATTAGTCTCAACATATGCAAACTCAATACATGTATGAAGGACAGAAATCAGAAGTAT
40 CTCAGAGATCAGAAAAAGGCATTTGAAATTTCTCAATATCACTAGACATCCCGAAGAACTAGGAATAGAAGAACATTATAAG
ACCTTGTAAAGCTTACAGCTGACTAAATGGGAAATCCAAGAGGATTTCTTCAAACCTAGAAACAGACAGGTCCTCACTGT
GTCTATTATTATCAATATCTGCTTAAAGTCTTAGCTAGAGCGACAAGGAGGTGGAATAATGGGAATATAAATGAAGAAAG
AGTCAGAGGTATCTCTTATTGATATAGAGCTATCCCTATTGGAGACAGCATGCATACATTTAACTCTACTCAAGACTCCACCA
AACTCTTAGATATGATTAAATAGTTCTGCAAGTAACAGGATACAAACCATACAAATCAGTAGCTTTCTATGTAGAAATA
45 TGAAACCACTAAGAAAGATAAGTTAAAAAATAAATCTTCAAGAGCTTCAAAAGAGTTAGATGTGAACCTAATAAAGAAATA
GGATGGCTCTAAAGTAAGGCCCTTAAAGCACTGAAGAAAGAAATTAATTTGATATTAGAAGATGCAATGTCTCCATGCTTAT
GGAATGGCATAAGCTAATATTGCAAACTAAGTGGACCATGAAAGGGAATATAGTTTAATTCAGTGTCCAACAAAGTCTAATGT
TTTTGACAGAAATCTAAGTTCTGATTTGAATCATGAAAGTCATTAAGAGCTAAGAGCAGTCTGAGAAGAAAAAATGGTGAAGG
GATCGAATCTATCTGACTTCAAATTTGACCAAGCAGCAGCAGTGCACAAAGACGTTGGTACTGAACAGATTAAACCAAGCTGAT
TAGAGTAACAGAAATTAGAGCCACACAACCTGTAGCCAAATAGTTTTGATAAAGGGGTCAAAAACATACATATACGTTAGAA
50 AAAAAATAGACTCTTTAAATAATACTAGGAGCCAGATAGCCACATGTCAAAGAAATGGAATCGGATTAGTGTGATCTGACTGC
ACAACTAATAATTTGTAATTTGATCAAAATCTTAATATAAGTCTGAAACCTGAAACCTCTAGAGGTAACTCACTCAAGCAGAA
GNN
NN
NN
55 NNN
NN
NN
TAAACTGTCCCCAGACTCAGAAACAATCACCACAAAGCCTGGCAAGGACAGGGGTGAGCAGGGGCTGACTCCTTGTCAAGT
TAGGGCAAGTGTGAACCCATATGGCCTCTATGGAGTCAATGAGGTTTCTCAAAACACTAAAAATAGAACTACCAATGACCC
AGTCTTTAAATCTGGAATAGACCAAGGATCCTAAGTCAATCAAGAGATGTTGCCCATCCATGTTTATTGCCGACCTATTCA
CAAAGGGATACCTGAGTGAGACAAAGAGGAGCTCAAAGGAATAAAGAGAGGTAACATACATGGTAGACATAGAAAGATTAAAT
60 GGGTTGAACAAGTTATGAGTGGTCAGGGAATGGGCCAAAGTTTCATGGACAAGGCATTAAATAAACAATTAAGTCTCAGAGGTC
TTTCTGAGAGCTGGGACTAGGAAGGAAAAACAGATTTTTTTTTTTTAAAGGAGAACTCAGAGCTCCCTCTCTACAGGTCTAA
TCTCAGAGATTGTCTAGGGATGGACACAGCGGTGGCTGCTACATCTGCTAGGTCTCATTGGCCCTCCATCTTATCCCTG
CGTTTTATGTAACACTGTGACCAAGGAGATGTCCACACATCATTAAAGACTTCACATAGAAACCAAGGATGAGTTGAGTGGCCC
AACTTTGGAGACCTGGGGAAGGTTTTAGAGCTCAAGTCTTTAGTCCAAGAGAATGGATGGATAGACGATGCTGACTAAGGAGGAG
ATAGATGGCTACCCCTTTGTTCTTACATGTTCTGAGATTCGCAGAAATGGCATCTACCCAGAGGTAAGTGAATCAACAGGCA
GGAGCCCCCATCATTGATATTTCCAGATTTGCTGTATGCTGACCAAGAGAGCACATAGTGAGAAAGGACCGGTGAGGCCGAG
65 GCACCGGCTTTGAAAGTGGTGTGAGGGAATGGATGGAAACATTGCTGTGGGTGAACCTTGTGTTCCGGGCTTTATTCTGGTG
ATGCTGTTGCTTTGTTGAGACATCTTAACTCAGTTGTTATGTGATTAAGTAACTCCAATTTCTCTTTAATTTCCATGCAAG
ATAGGGCTTGCTGTAAAGTGCACTGACAGAGGAGCGTTCTATATTAGTGAGGAGATGCTATCTGCAAAATACAGGGAATGA
TGCATCAAGGTCCCTGGTGGTGAATAAACCAGAAATAAGAAATGAGGAGCCAGAGAGGGGCAATGTTCTAGAAAGTCACTAAGA
ACCAAGTGTCTGACTCTGACTGGTAAATGATTCTTGGTCCCAATGCCCTCCCATGCCCAAGCAGATGGCCTTCATGCCCTT
GGGTTAGAGGAAGAAATACATTGAACATTTCTCTACACCTGAGAAAAATGATTATCATCTTACCAGGACAGTTAAGTGCC
70 TAAACCTCAACACCAAGGCACTGTGATTTTAGGAAGGAGGAGGAAACAGGCGCATCTATTTTGTGACTTACCTTAAACCCAGGA
GCTATCAGAGGGCTTCTGACATTTTAAAGAAAGAAAGCGTAACACAAAGGCAAGCATAGGGCCTTCTGGGCTGATGGAG
CCGAGGGTTCAAGTTTGTAGTGACCGTGCCATTTCTCCCATCTGAATACAGAAATCACTCTGGGATTTTCATCATAGACAAAC
ACAATTCAGGTCAACAGAGTAACTGCTCTGTAAGTGGTAAATTTCCAGAGGCTTAAATAAATAGATGAATAAATAAATAA
CAAACAAACAAACAAATACACATACATACATAACATACACATACATACATATATTTTATAATAGTCTGTGCAACCTAATG
75 TATTTTTCAGCTCATTATTTAATTATTAGGAATCCAGGTACCTTAATTTTTTGTGCTGTCTACACATTTTCATGCATACC
AGGT

MOUSE SEQUENCE - mRNA

5 GGGACCCCTTGTGCGCTCAGCTAAGAGTGCGGGTGAGCGCACAAAGCCAGGAGGAGGTCCGCACGCGTCATGAACTTGGAGACGG
 GCAGCCGGGGCTCAGAGTTCCGGCATGAGCGCAGTGAAGTGCAGGCAATGGGAACTCCGACAGTGGTTGATCGACAGATCGACAGC
 10 GGCAGGTACCCCGGGCTGGTGTGGGAGAACGAGGAGAAAGAGCGTCTTCCGCATCCCGTGGAAACACGCGGGCAAGCAGGACTACAA
 TCGTGAGGAGGACGCTGCCCTCTTCAAGGCTTGGGCATTGTTTAAAGGCAAGTTCGAGAGGGATCGACAAGCCAGATCCTCCTA
 CTGGGAAGACAAGATTACGATGTGCTCTGAACAAGAGCAATGACTTTGAGGAATTGGTTCGAGAGGAGCCAGCTGGATATCTCTGAC
 CCATACAAGGTGTACAGGATTGTTCCAGAGGGAGCCAAAAAGGAGCAAAAGCAGCTCACTTTGGATGACACACAGATGGCCATGGG
 15 CCACCCCTACCCCATGACAGCACCTTATGGCTCTCTGCCAGCCAGCAGGTTTATACTACATGATGCCACCCCATGACAGGAGCT
 GGAGGGATTATGCCCCTGACCACTCACCAGCAAAATCCCATATCAATGTCCTGTGACGTTTGGCCACGAGGCCACCACTGGCAA
 GGCCCATCTTGTGAAATGGTTGCCAGGTGACAGGAACCTTTATGCTTGTGCCCCACCTGAGTCCAGGCTCCTGGAATCCCCAT
 TGAGCCAAGCATAAGGTCTGCTGAAGCCTTGGCGCTCTCAGACTGCCGGTGCATATCTGCTGTATTACCGGACATCCTCGTGA
 AAGAGCTGACCAAGCAGAGCCCTGAAGGCTGCCGATCTCCACGGACACACCTATGATGTTAGCAACCTGGACAGGCTCCTGTTT
 20 CCTACCCGACGACAATGGACAGAGGAAGAACATTGAGAAGTGTGAGCCACCTGGAGAGGGGACTGGTCTCTGGATGGCTCC
 AGATGGGCTTTATGCCAAAGACTCTGCCAGAGTAGGATCTACTGGGATGGGCCCCCTGGCACTGTGACAGCGATCGGCCCAACAGC
 TAGAAAGAGACAGACTTGCAGCTCTTTCAGACACAGCAGTTCATATCAGAGCTGCAAGTGTGCTCACCATGGCCGCGCCAGCA
 CCGAGATTCCAGGTGACTCTGTGCTTTGGTGAGGAGTTTCCAGACCTCAGAGACAGAGGAAGCTCATCACAGCTCATGTGGAACC
 TCTGCTAGCCAGACAACCTGTATTACTTTGCTCAACAAAACACTGGACATTTCTGAGGGGCTACGAGTTACCTGAACCTGTACCA
 25 CTCCAGATTACCACCGCTCCCTCCGTCTTCCATCCAAGAGTGAGAAGAAATCTCTGACAGGGCAGCCGGTGTGCTGCCCTTT
 CTCTTTGGAAGAGCTAAGAAGTGAAGTGGGTTTCCACTTGAAGACAACACAGGGCTTTGTGAGGAAAAACAGCTGTATCTGCTCAA
 CAGAGGAGCTTCCCCAGAGAGTGCCTGTATCCAGGCTTTCAGCAAGTGCAGGACTTGGGTGACTGTGCCCTGGCTTATAACTG
 TGAACCTTGATCAGTGTGTTTACATGTACTTGAATGCTGGCTTTAGCCTGGTATAGATGGACTTTTGTCTGAAGACTGAAAC
 CTGTGCCAGCATGAATCCCTGACAGAGAAGACATACGTATTATGTTCCATTCTCAGGGAAAGTAAAGTCTAGACTAGAGACTAC
 30 CTGTGCCACTCACAGAGAAACGCACTTCTGGATAGAGGAGCTTAGGTTGCCAGATCATGTCTCACTGAGTGAAGGACTTGGTCT
 TTAGGTCAGTCTTAGGCTATCATGTCTGATCCTGCACTCTCTGAGTAGACCTACATCTGTTTGTCTCCTCTCTTCTGCTCCTT
 CCCTAAAGCCAGCTGGTGGACTCTTGTGTCACATACTTGAGCCAAAAACCATCAGGGACATATAAGATGAGACATGTTTGCAT
 CTCTCTGATCTAACACGGCTACAAAGTTTTTTGTGTTGTCTCCCTTCTGTTTTCCTCTCTATTCTTTAGAATTGTGTC
 35 TTTTGTAAAGAAAGGAAGAGAGAGAGACCGAATATACTAGAGATAGATTTTTAAATTTCTGTGCCATTTCCCTTCTATTGTT
 TTGTGGCCATCAGTGGTCCCATGGCAACACTGGAAGGGCGAGCCCTTGGAGAGGTTGGGAACTGTCCCGACACCAAGTGGTTC
 AGTGTACAGCTGTAGACTCAGTGAGCTGTTCTGCTTATTTGTATATTAGATGCTTCTGTGCAATAATAGTTTGCAGAGCTC
 TCAAGACTACCGGGCTCTTTTCCAAACACACTTCTTCCAGAAATCCCAAAGAGTCTCACTTGCTTCAACACCTGTGATCTCT
 40 TTATGTTACTGTTTGTGTTAGTGGCTTTCGATGCTCTGGGATTTTTCTCTACCAACATCATTTCTGACTCTTTCGGGCTC
 AGAAGAGATTAAAGCGCTCTTGCACTTGGCACTTACTCTTTTAAATTTTTTTTTTAAATGCCACTTTAATATTTCTTTAA
 GTCTTTAGCAGCATACATTCAATAAGCAATGGACCATTTGGGTGCTCATTTCTATTGTTTATTTTAAAGGAACCTTTGACAA
 45 ATAATACACATTACAGAAATGGAAGCATTTTCATAGAGAAGGTAAGAACTGAAATGCATTTATGTTGGAATCCTCCTGTGAG
 TATTAGCCCCAAGAGTTCAGTCTGCTCTTAAAGCATGTTTATGTTTCAATACATATATAGAAGTGGCCCTTTCTTAGAGAGAGA
 GAGAGAGATATGTGATGACACTCTTATGTATCCCACTATACAGATTACCTCATCTTTGAGTGGCATGTGACTTCCACTGCTAT
 GTGCTAGGTGACGTTTACATCTTCTAGTACCCATCCAGCAGCCCACTGAGTCTCGTGAACATAAGTCACTTATACATCTT
 ATAGATGCAAAACACTTGGGGTATATTATCCCAAGGGAAGATGAAGGCAAAATCGGGAAGCACTTCTCTGAGGGCCCCAAGCCAC
 50 AGCTGCTCTCTGAGTATCTTAAACATATCTGGCACTTCCCAAGGTCCTTGCTGCTGCTGTATGACCATCTTCTGCTC
 ATAAGCAGATGCTTGTCTCAATTGCCATGTGAAGTCTTTTGGTTTTTGGTTTTTCTTAAATGTTAAGCTGTTTAAACAGTGAA
 GCTGAATTTCTGAAAAATGCTGTATGGTTGAGCCCGGAGTTCATGTTTCACTTTACAGCCATGCATGCTGATGCCCTCCATCTT
 GACAAATGGAATGATGGGTAACACTCTTGACACAAAGAGGAACACTTCTCGTCCCTTGCTGAAACAAAGTGCAATGCACATG
 55 TAGAATTTAGTTTGTCTGCACTGGAAGATGCGGTGAGGAGGCTGAGGAACTGATCTCCTAGGAGGAAATATGCAAGTCT
 CACGGGTGCTTCTGTTGGCTTGTCTGGTCTCTGAGCAGGCTTAAAGTATCTAGTTTCAAAGTGAAGCCCCAAGCCCTCAGTC
 GTTGTCTGACAGAGTTGGTAGACCCCACTGTAGAAATCCAGATGCACTCTGGGATTGGAGCACAGAGAGGCTGCTCTATCGT
 GAGAAATGCCAGCTGACAGAGCCAGGTGGGTGCTGAGTGGCTGTATGCCAGACACAGGAACGCGCAGGAGCTGAGTGTGGTG
 ACTGATATGTGAGGTGCCCTTGGCTGACAGAGGCTGAATGTGAGCCCCAGCAGCAGAGGATTCTGAGAGTCAAGGTGGTGTAT
 60 GTCTACACAGGAGAGCCTTCAATATTACTTTTAAACGAACCTTCCCATGCTGATATTTGATAAAACCCACACAAGGTTTA
 ATTACATGCCCCCTCATCCCTCTCCACAGTCTTGCCCATCCCACTGGTGAATGTTGTTGTTCTTGTGTTTGTGTTTGTGTTT
 GGTGAAATTTGAAATTTGTTAAGTCTCTGTTTGTGTTTATCTCTCTAAATCAGATGGCTGCTGATACATTGCAATGTTGC
 65 CCTACCACATGATGTTTTGCAAGTGTCTTCTCACTATTGAAGAGCCTGCACCGTAAGTGAAGTCACTTAGTCTTGTCTAA
 TTGCTGCTCATGTCACGTGAACGACAGAGAGGCTGATTTCTGAGCCCATTTTCAAGTCTTGGAGGAACATGAGTCCAGAGTAT
 ATTGAAGTAGAAGACAGTGTGGAAGCCAGTCTTATTAGACACTGCTACAGGCTTCAATCTTCAAGGTGGACCCACCTCAT
 70 TTGGAAGGGCATATTGCCCTCTGCTCCCATGCGCTGTGACCCCTTACAGTGAAGAGCTGCTGGGACCCAGGACTCAGAGA
 TCTCTGGCTTCGAGCTCATATCTGGCTTCTGTGATGTTAAGCCCGACAGGAAAGTGTGGCACCATCTGCTGCGCGTTGGA
 TGGATAGGCCATGGATTTTGTGTAACCTTGCTTCAAA

MOUSE SEQUENCE - CODING

60 ATGAACCTGGAGACGGGCAAGCCGGGCTCAGAGTTCGGCATGAGCGCAGTGAAGTGCAGGCAATGGGAACTCCGACAGTGGTTGAT
 CGACCAGATCGACAGCGGCAAGTACCCCGGCTGGTGTGGGAGAACGAGGAGAAAGCGTCTTCCGCATCCCGTGGAAACACGCGG
 GCAAGCAGGACTACAATCGTGAGGAGGACGCTGCCCTCTCAAGGCTTGGGCATTGTTTAAAGGCAAGTTCGAGAAAGGATCGAC
 65 AAGCCAGATCCTCCTACTTGGGAAGACAAGATTACGATGTGCTCTGAACAAGAGCAATGACTTTGAGGAATTGGTTCGAGAGGAGCCA
 GCTGGATATCTCTGACCCATACAAGGTGTACAGGATTGTTCCAGAGGGAGCCAAAAAGGAGCAAAAGCAGCTCACTTTGGATGACA
 CACAGATGGCCATGGGCCACCCCTACCCCATGACAGCACCTTATGGCTCTCTGCCAGCCAGCAGGTTTATACTACATGATGACCA
 CCCCATGACAGAGCTGGAGGATTATGCCCTGACCACTCACACCCAGAAATCCCATATCAATGTCTGAGGAACTTGGCCAGCAG
 70 AGGCCACCACTGGCAAGGCCATCTTGTGAAATGGTTGCCAGGTGACAGGAACCTTTATGCTTGTGCCCCACCTGAGTCCCAGG
 CTCTGGAATCCCATTTAGCCAAAGCATAGGTTCTGCTGAAGCCTTGGCGCTCTCAGACTGCCGGTGCATATCTGCTGTATTAC
 CGGGACATCTCTGAAAGAGCTGACCAAGCAGAGGCTTGAAGGCTGCGGATCTCCACGGACACACTATGATGTTTAGCAACT
 75 GGACCAAGTCTGTTTCCCTACCCGACGACAATGGACAGAGGAAGAACATTGAGAAGTGTGAGCCACTGGAGAGGGGACTGG
 TCCTCTGGATGGCTCAGATGGCTTATGCCAAAGACTCTGCCAGAGTAGGATCTACTGGGATGGGCCCCCTGGCACTGTGACG
 GATCGGCCCAACAGCTAGAAAGAGACAGACTTGAAGCTCTTTCAGACACAGCAGTTCATATCAGAGCTGCAAGTGTGTTGCTCA
 CCATGGCCGGCCAGCACCGAGATTCCAGGTGACTCTGTGCTTTGGTGAGGAGTTTCCAGACCTCAGAGACAGAGGAAGCTCATCA
 CAGCTCATGTGGAACCTCTGCTAGCCAGACAACCTGTATTCTTGTCTCAACAAAACACTGGACATTTCTGAGGGGCTACGAGTTA
 CCTGAACACCTTACCCTCCAGATTACACCGCTCCCTCCGTCTTCTCCATCCAAGAGTGA

HUMAN SEQUENCE - GENOMIC

5 TCCTGAGATCTTATCTTTGATATAGTTAGCTCCATTTACACTTAGCAGATAATACCAAATTAACACAGAGACTGAATTCAGTGAG
CAGAGAAAAACAGCCTAGCCCATGGATTGTTCTCAATGCACTGCCTCCTGGCTTTGGTGATTTTGCAGAACTGAAAGAAAAAGC
10 ACAACATTCAGAAATAGAAAGGGAATTTCTGAAGGGAGTTTCATAACTGAAATTTTCAGTTTGAACCTGGATGAGGACGCTGTTTGT
TCAGTGACCACTGAGGACCTCCGGCAGGCTTCGGGGTGTACAAAGACAGCCAGGATTGAGCCCGCTCAGTGGAGGGCCCCACAGC
ACAAAGGGACCAAGAGGGATAGCAAGAGGACAGCCAGAGTGCCCAAGCTCGGCAGGAAGGAGGCTCACATCGCCCGGGAAGTC
TCGTGATGGTTCTGGTAGAATCGTCTCTTGAAACCTTCGTGTCATTATTGGGTTCTGTCCAATATGCCTTACGCAAAACACTG
15 ACAATAGCATACACCTTTCCAGAATGCCGACGCGCTGTGCAATGCCAACTGTCCCTGTGAGTTGAATGCCCTGGCAGGATG
CGTGTCCATCCCGCAGGGCCGTGGGTGCCTCCCTGTCTCACTCCTCTGCTTCAACCTTCCAGAACTCTGAAGGTTTGAGATG
AAATGACTGAGCCACACCTAGTGAGGAATGAGCACCAGGGCTCTCTGCAACGGCTGCTTAAGGGCCACAGGATAGCATAGTGT
GGCAGCCCCAGTTATTCCCTGTTTCGCTCATTGGACACCCTGATAGGCTTCAGGGAGGCAGGAACCTCCTTAAGGCAGCAGGAG
AGGGGTGGATGGGGCAGCCACAGGTGCATCTCATGCTCCGTGTTCTCCATAGGGAGGGAGGTGGGCTAAGAGGGCAGGTGGGGCA
20 GAGGCTGGGCCAGCGTGAAGTGTGAGGAGTAAGGGGGGAGAACTGGAGGGGGCAATCCAGAGGCAGCTGAGGCTGCATGCT
GCAAAATACAGCCCGTTACGTCTGTGTAGCTTAGTCTCCAGCCACCTGAGCCAGAGCTGGGTCTGCCCTGTCTCCGCTTCT
ATTGACATCCAGCAACTCCAAATGACCTCTCCATATCAATGGGCTCATCTCCGAAGCCGAATCTTATAGCCTGCTCTCTCCCC
ACCAGGCTATAGTGGGAAATCATTGAGGAAATATGGTTGAATGCATCGCACGGCTCTCTGGTGTCTGAGAGAAGCTTCATAGCC
AGCAGGCTGCCCTGGTGGGCAGGTGCCGATGAGGTACACGCTCCCGTGCAGCGAGTAAGAGGGCAAGGAGAGCTTGTGAG
GGGAGTGGGCCAGGCTATCATCAGATGGGCAGGCTCGCATCGCTCTCTGCATCTAAGCAAGCTCTGGAAGTGTGAGTGCCTGG
25 GTTGTGGTACTGCAATGCCACAGTACCTTGGGGAGCCCCAGGCAAGCCAAAGAAAGTTCTGGGAGGCCACAGCCCTTCACTCAAG
TTCAAAGGTTCAAAGCAGGGATTCTGTGTCACTTGCAGAGGTGCCACCCCAAGAGCTGTGGCTCTGCAGGACAGCTGCGG
GGTAGACCTCTAAGGCCTTGTCCAGTGGAAATGCCCTCCACTTGGCCTGGGTAGCTGCTCAAGCTTCTGAAACGGGAAAAATCA
ATGCTATTCTGAAATGGAGCCTCAGAGCATTAGAAAAGATAATGTTCTGATTTTAAAGCTAAACGTATATGGAAGGAGAGCTGA
AAGAGAGCTTTTGTAGTACCTTAATGTTGATGTTGAAATAAACCTTAATGACCCTCTGGCTAAATCTGTTCTCATTTGGGAAGC
30 ACCTGAACCTCATTCTCCGCCACTGCTCTGACCTCTGGAAGCAAGGAGCAAGGCACACTCAGCAGCTCCCGCTCCAAATGCT
TCTCCGAGTCCCTCCAAAGCAGCCAGAGGAGGACTCCACCCAGAACCCAGAGTGGCTGGGAACAGGCTCAGGTTCTCTGGCC
CATTGTCATCGCCAGGCTCCTCTGCGAGGAATCCGCCCACTCTGCTGCTCTAGAGAAGCCAGCTCTTCCATCAAAGTTT
TGCTCAAATGTCACTGCATGTTACGTTCTCTCACACACTCCCACTAGCCTTACTGCTCATGCTTGGTTGTGAGCTATGTTG
GGGTCTTCTCTGCAACCTTCTTCTCCCTGAGAGGTGCAATGACCTCATATTGAGGCTGTCCACTCCCCCTCCCGACCCCATC
35 CACCAAGCCTGGGAGGCACTGGCTTAATGCATCATGTTTAAAGAAATGGATGGTTGAATTGCACAGAGAAGACACTGTGCCCTC
GAGATGTGCTTGCACAAGATCCCTGCAGCAGATGCTGGGAGGCTCTGCCCGGTAGCACTTAGGAAAGAGGATGTATGCCCTGG
GCTGCTGGGAGCACTGTGGGAATCTGGGATCCCTCTCTTAAGGGCTGTGTACCTGATTTGGAACAATACAGAGGCTTCT
CTCTGCAAGAAACATGCCCCCTGCCACCCAGGATCCACCTGGCTGGGAATCTGCTAGCTGGGAGCCAGGTGGGCATGCTAA
40 GGAGGAATGGGGTGTGTCTGAAAGAAAGAGATGCCAGCAGGATGCCAGGAGAGTACAGCTCCTGGGGCTGTGAGAGTGTGGG
CAAGGAGGTGTGGGAGCATAGATTATAGAGAGAGTGGTTCACTGTGTGGCCATGCTCCTGGGACACAGCACTGAGCACC
CAAGGCCCCCAAGAGATGCTGAAACACACAGCTAGGATGGCTCCAGGAACGTGAGACAGCATTAAACACAGGAAGCCAGGCAGAA
GTGCTGCAGCCAGGGCGTGTCTGTGGAGAAGGGCTGGGAGGATGCACTCGCTCGCACACTGCGCTCAGAACTCTCACATGAGT
TGCTCTCAGTACGAGCCAGGTGGGGTGGAGAACGCCCACTTACCAAACTCTCAGAGACCCCTTGGGGAATTTGTGCTTCTTG
45 TTTCTGCAAGTTTCCAGGAGACACAGAAAGGGTGGCACTAGACTTAAGCTGTGGGAGGCTCTGGGAGGCTCCTTGGGTGAGCT
TAGCAGCAAGAGGATGTTGACCTTGGTCAATCAGGAGGTGTGGAGCTGTGCTATACAATGGGGCAGGACCCCGCAACCCATCC
GGGCACCTCTTGGCTCTCCCTGTGTATTGATGGAATGGTATGTGGAGGTGCAGCACCCTGGACCAGGAAGGGCACCCTGAC
CAGTTCAAAGCCCTCAAGGATGAAGCTTGGGTCTGGCACTGAGCTGTAGTTGAAAGGTGGGAGCATCTAGAAAGGACAGAGCT
GAGGCGCTCAGAGTCTTCACTGGCGTCTCAGCTGAGGGCTGAGGCTGGAATCTGTTCCACTAACTTCTCTCTCAAGTTTTC
50 TCCAGGATAAAGTTGCTATTGAAATTCAGATAAACCAAGTAGTTTCTTTAGTGAAGTACGTCCTCAATATTGATGGAATAC
ACCTATACTAAACCAAGTTATTCAATGTTTATCAGAAATGCCAATTTAACTGGGAGTTTGCATTTTATTGCTAAACCTGGCAA
CCCTCTCCAGGATGGAGGCCACTGGAACCCAGGAGGAGTGCCTCAGGAGCTATGAGAGGAATGGATCAGAGAGGCTGAGG
TGATAGCTTGGGTGGATGTTGTGTGCACTGCTGGATTCCACTTGGGAGTGAGAGTTTCTTCCCTCGGGTACTGAGACTGCTC
CTGGGAGGTGGTTCTCAGCAGGCAGCTTCTGTGGCGATGGCTCCAGCTGGAGAAAACGAATCTCCACGCTCAGCTCTCTCTAGA
55 GGCAGCTGGCACCCTAATGCTAGCTCAGTCAGGCTGCGGGGGCCCTATCCCTTCACTCCAGCTGGAACAGGCTCGTCTAGCTCC
AGAGCTTCTGCGCAGCACTGAGTGGAGTCCATTGGCTTGGCTTGGCTTGCATCAGGGCCACTCTCGGCCAGTTCTGCTCTCTCC
TGACTCCAACCAAGCATGCTCCCTAATCATACATGCTGACCTCCATCTCAGAGTCTGCCACCGTCCCTGTTAAAGGCTGAAGGAGG
ACTAGGATCACTGTCAACAAAAGCATGACCCAAAGAGGCAAGACACAGTCAATGTTTATAGCATATTACTATGAGCCACTCACTACT
CTAGATGTACCGGTTCAAAGGTGATTGAAAGAACTCTGTGTTTCCCAATGCTGCTGGATAAATAAATCACTAGCATGCGTGA
60 CAGCATCTTAACTTCGCTGTCTCCCGGTAATCGTGTCTCTCTCTCACTTCTTATCAGGGTTCTTGGTAATAGTAGTCCCC
CCTTATTCTCAGGGGATAGATATGTTCCAAAACCCCTAGCAGATGCTGAAATAGAAAGACAGTACTGAGCCCTTATAGACTATGT
TTTTTCTGTACGTACATAGCTAGGATAAAGTGAACCTTATAAATTAGGCACAGTGAGAGATTAAACAACATAAATAACACCAA
GCAATGATGACCATACGCTGTAATGAAAGCTGTGGATGTTGTGCTCTCTCAACATCTCACTGCATGGCACTTGCCTCTAATGG
CCTGATGGCTGCCACATGGCTGATGGGCCAGCAGCATATACAGTGGGGTCTGCTGGACAAAGCAGTGGTTTCACTCCAGAGGGA
TGAAGCGGGACCTGCGCGATGTCAACCCTGCAAGAAATGGCATGCAACTTCAAAACAAAGTGTGATTCTGGAATTTTCCA
65 TTTCTTATTTTCACTGAGGTTGCCCTCAGGTAAGTGAAGTGTGGAAGGGAAACGGTGGATACAGGGGACTCCTGTGTCATT
CCCATCTGGAACCCCTCCAGCAACCCCTGACTCCCCGACCGCCCCACCCCTGCGGAGCAGTCTACTCAGCCCCATACTGCTT
GTCCTTCCCTCTCTGCCACCATGCACCTGCCGCTCTGAGAGCTCTACTCTCACCAGGCGCTCCCGGCTCTGGCCATTG
GTCCTCTCGGGCGGTACCCACACTATGGCCAGATAATCTCTTACTGTAGTTCTTACCTTATTACGGGGGAATATGAGCCAA
AGCCATGTAACCTCGTGGCGGAGGAACTAACAGAGCCAGCAGCATGCTTCTCCGTAACCTTCTCTCATCAGGTGGCCAGGAAT
70 GTTCCGGATCCCCGTGGCTTTGCCATGGATATCTATTGAAACAGAGTAACCCCCCCCCAGAACTCTCAGGGGTCTCGTTACC
ACAGCATTAACCTAATCTTCTAGAAAGATACACTCCTCTATCCAGCATGCTAGAGTCTTATGTGTGACAGGATGACGATGCTGT
TTCACAAAATTTCTGTAAGAGCCGTTGATGAACCTTAGAATAACCCAACTTAGGCGCTGTTACAAATGGGTGGAATATAGACAA
AAGCGTTTGCCTTTCACCTTGTCTCAGTTTTCAGAAAATTTGCCAAAGGTATTGCAAAACATTTCGCTTTTTCATTGGCTTGGTT
75 AAGAGTTGGCAGTGTCAACTGGCCCTGTGTAAGCCACGTCATGTTTCTGTAGAGAGCATGACAGCTCAGAGAGGTGGGAAGTG
TTGCCAGGACTCTTCTAGAATGCTGGCAAGAGAGCAGGCGAAAAGGGAAGAGCTGTTTATAAACAGGGAAGGAGACATCACT
CGTATCCTTGGCTTCTCATTACGTCTAGTATCAATCAAGCTCTATTCTTCAAGCCTGAAAGCGGGTCTTCTCTGCAATG
AGGAAAAAGCCCCCTTACTAATCTGCTCCTCAAGAGATCAAGCTGGTCTGAAACGCTGTGCCCTGGGAATGCTTACTGTC
GAAGCTCTGCAAAATTTCTCATTGAAGGCACTCAGGCGATTCTGCTAATTAATAGGAAAAATGTGTACAGCTCTACTTGAAAAA
TCCACCTTATGCTCTGTATTCTATTACCAAGAAATTTATCACTTTTCAAATAACATTCAATTAATTTAAACTGAGTGTGAGTGA
GAGCATTATAATATAATCTCATTCCAGAGTGTCCATCCCACTCCTCTCTGTATAGTAGCTTAGAAGTTAGATTTTTTT

312

AGTGAGACCTGCGCTCTGCAAAAAATAAATAATTAATAAATAATAGCCAGGCATGGTGGTGAACACCTGTAGGCCGAGGGCCAGCTA
CTCTAGAGGCTGAGATAGGAGGACCTAGAACTCAGGAGTTGATGCTGCGGTGAGCTATCATCGTGCCACTGTACTCTAGCCTGG
GCAGCAGAGCAGGACTCTGATTCCAAAAAGAAAGCTAATAAACACAGACATGTATTTGACTTTTCGTTCTCTTATTCTTTCCCAC
CAGGCTTGGGCACTGTTAAAGGAAAGTTCCGAGAAGGCATCGACAAGCCGAGCCCTCCCACTGGAAGACGCGCCTGCGGTGCGC
5 TTTGAACAAGCAAGTGAATTTGAGGAAGTGGTTGAGCGGAGCCAGCTGGACATCTCAGACCCGTACAAAGTGTACAGGATTTGTTT
CTGAGGGAGCCAAAAAGGTAGGGGCTCTCTGAATTTGGGTACCTAACAGAGGCAGCCAGATCCTTGAGGCACCTTAACCTCAT
TCTGAGCATCACTTTCTAGCTTTCTTTGTATTGCTGCTGCTGCTGCTTCTGCTCAGAGTGAAGCCAGCCTCTTCTGCTGAG
10 TTATGTGGGTCAAGTTGAAATTTCTGTGGGGTTGAGCATAGGAGAAATTAATCAACTGTATGCTCAATGTATAGGGGGGGG
TGCATTGAATATGTGTTTTCCAGTTAGTCTTTCAAAAAAAGAAAAAGAACTGGATAACTTGTAAAAATTTACTTATCTA
ATAGTCTTTAGTGAGTGACTATTTTGAGAAAAGGAGTAATGAGAGGAATATCTCATCACTATGTCATGTAATAAACTGTCAACT
TTTAAAGTGAACATGGTCAGCTGAGGTGTTTATTAAGTCAAGTCTTCTGACCCCTCTTTCAAGATCTGACAGGTGTCTG
GAAGAGAGCTCAGGAATCTGCATCTGGAACAAATCTTCAGGTGACCTCACTTGGGAAACATCTGGCTGGCGGGTCTTTATGTC
ACAAGGCACATTCGCATGCCATCTGTCTATGTTCTTTACTGTCTGTACAACTCAGACCTTGTAGAAAAAATCAGTTTAATA
15 CATGAAAAAATAACTTTCCCAAGGAGTGTCTGAAAAATACCTTTATTTGTCAACACGCTGTATGCACTTAAAGAAATTAAGTCTC
AGGTATTTTACAAGATTGACATTTAGTTAGGTGAGTCTGTTCTGTTTTTACGTTGTGCCATTTCCCTTTTCCCAACATGTAGGAG
CCAAGCAGCTCACCTGAGGAGCCGAGATGTCCATGAGCCACCCCTACACCATGACAACGCCTTACCCTTCTGCTCCAGCCAG
GTATGGTGGAGGCACTGGGCTCCTGAGGGCGAGGCTGTGTGGGCCAGCTGCCACATGGCCAGAGAACCACAGCAGCCAGACA
GCAGAACTTGGCATTGTGCTATGCTGTCTCAACAGCCAGGAGTCACTGAAACGATGTCTCACTTTCCACAGCTGGTGC
20 TGCCATTGGTGTGGATTAAAGTTGGGGAGGGTGGGGCGTGTCCGCTGTGGAAATATGCTTCTCAGGTCTTCTGGGAAACAGATG
TTTTGTGGAAGTGAAGATTGGAAGTAGTGCTTATCATGTGAAACCAAGGGCAGCTGATCTTTCAGGCTTCTTGTATGTGA
ATGACAGCTTTGTTTTCATCCACTTTGGTGGGTAAAGAGAAAGCAAAATCCCTGTGGTACTTTTGGTGCCAGGTTTAGCCATATGAC
GAAGCTTTACATAAAACAGTACAAGTATCTCCATTGTCTTATGATCCTCCATGAGTGTTCCTACTTAGTCTGATGAAGGGTTCA
CTCCAGTCTTTTCCGATGATAAAATGCTTCGGCTGTGAGTCTAATAAGGGATTCCTGAGGAGTTTGGAGGCTGTAAAGAGCACCCC
25 CCGTCTCAATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTACCCCGTCTCGATGCCAGTGCTTCTTATCTCAGCCTC
TCTGCACTCTTTACCCCGTCTCAATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTACCCCGTCTCGATGCCAGT
GCTTCTTATCTCAGCCTCTCCTGCACTCTTTACCCCGTCTCAATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTAC
CCCCGTCTCAATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTACCCCGTCTCGATGCCAGTCTTCTTATCTCAGC
TCTCTGCACTCTTTACCCCGTCTCGATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTACCCCGTCTCAATGCCA
30 GTGCTTCTTATCTCAGCCTCTCCCGTCTCAATGCCAGTGCTTCTTATCTCAGCCTCTCCTGCACTCTTTAGCAGGTTACAACTAC
ATGATGCCACCCCTCGAGGAAGCTGGAGGACTACGTCCGGATCAGCCACACCCGAAATCCCGTACCAATGTCCTCATGACGTT
TGGACCCCGCGGCCACCACTGGCAAGGCCAGCTTGTGAAATGGTAAGGAGGATACAGTGCAGGAATAGAAGAGCTAAGTGTCT
AATGTGGCCATGGGCCATGGCGAATCTGTGTCTCTGCGGAGCACCAGCTCTTCCCTCTTCTAGAGGCTGCGTGTGCGAGT
CGGGAGAGGGGGGTTTTCTCACTCTGTGGGATGGTGGCATCCACAGCCAAAGTTTACTCTCAGGATCCATGCTAGGCACTGCCC
35 TCTGTGGGATCTTATTTAAACACACAGAGTCACTCAGGAGTGGGAAACAGCCCGCACTTTTATATAGAGAGGAGATGTG
GAAGCTCATAAATAAGTAGGGATGCTGGGAGATTATGAGCTGGTATATTCTCTCGAATAGTGGTGTGTTCAITGTGTCTAT
TGTGGAATTAGAGGTGATACTAAAAAGGAACGGAAAAATACATGGCAACACATAAAACGCTCTCTACAGGTGCTCACTACCA
CTGGGTCACCAAGAGCTTGTCTGATTGTGGATTAGATGTGGTCCCTGCGGAGTTCCCGAGATTCACAGATCAAAATGAGCTCTCT
40 AGCAGAAGCTCTCATTAGCTGGGTGAGGAGAACTAGCAATGCGGTAACTCAGGCCCTCAGGACTTTTGTAGTTAGTTACTTAA
TGGAAAGTCTGAGACAGGTCAACACACTGAACCTTTGGATGTTTTAGGAATATTGTCTCTTGTCAATTTGGCTTTTTTCCCC
AGTCTGTTCAAGTTATCTCTTGGCTGAGGTAGTGAAGAGGTGTACCACTCTTAAATGTTTGTACTGAGTGCCATGTTTCAAAAA
AGCTCAGAATTCAGTTGCATTGGCTTTTCAAGAGGAGTTGAGCAAGGGCTGGTTTCCAATATGGTAGTGGAGGAATGGCTAAC
45 ATAAAACTAGCTCTGAAATTCAGACTTGCCTTTACTGCTCTGCTGCTATGGAATAGTAACCATGGGAAAGAGGCAATGCTTAGA
ATTGTGTAAGATGATGAGTAGGTAGAGACTGTCTGAAGCATCGGTAAACAGTAATGAAGCAGCAGCAAGATCAGGTGTTCTGT
GCCACATTCTTTTCCATTCTGTTTATACACATTGTCTTCAGGAACATGGTTTCACTGTTTCTCCCAACCCACAAGAGACAAGCA
AAATAAAAAATGGACTAAATAATTGCTAGTTTTTAATTTGGGCTCTTTGGCACAGACTCAAGTAGACCTGAACCTCTCAGCTCTGTTG
50 TGAACCCGCTTTGTGAAACAGGACAAAGCATCTGTCTCTGAGCCTCAGTCTCCCTGTGTTAGTCACTGACAGAGAGCGCTC
CAAGTTTCTCTTCCAAAGCTGTGCACTGGCTGTTTCTCCATCAGCTTTGGTTTTCCAGTTGGTCTCCAGTCTCATCTTGTCTCACA
AGAGCGTGCCCTGCTAGTTGCTGGTGTGAGGAGTGGGTGGGAAGGTGATTGGGCGCCAGCCCTTCTTCCAGGCTTCAACACA
CACCCAGGAAGCCCGCGGTGCGTCCGACTCTGTCTAGACATCATCTGATTTTTATTTGCAATGCAAGTTGCCAGGTGACAG
55 GAACTTTTATGCTTGTGCCCCACTGAGTCCCGAGTCCCGAGTCCCAACAGAGCCAAAGCATAGGTTCTGCGGAAGCTTTGGG
TTCTCAGGTGAGTGCAGGGTTGCTCTGAGGACCCGAGGAGGCCAGCCTCTGCTGCGAGCTCTGTCTCTTTGGGAGATTG
ATGGGACTTTAGACACTTGCTTTGCTCCCTCTGGGGTCTGGAGTAGATGTAGACACATCTGTGTGTGAGGTGACAGGGTGATTT
AGGAGTCAATAGAAACCTGACATCACTGCTTGTGGTTCTGCTGACCGTTTCAAGCACTGGCTTGAATGGAGTCAATTTGCTGAA
60 CTTTCACTGGCACCTCTCTGAATTTCTAGGAATGTGCTTTTACCTTTACCGAGGGCCCTCTTCAAGCAACATTCTCAGATGTGGA
ATAATTTGCTTGAAGTGTAGAAGGGCTTCTCATTGTTGAGAAGCTGATCATCTTCCAGGTTGAGCCACAAATAAGTCTCTCTCT
TACTCCCTGGGGACATTAGTTCTGGTCCCTCATCTCTAAACATTGATGTGCTAAGAGTAATACACATTGTTGCTTCTCTGAA
CTTTAATATAGCTTGAACAAATATGGATTCAATCTGATTTTTAAAGTTTTATTTCTAAAAAATAAAAAATCCCTGCACCA
TGGAGATTTTACCTACTATAAAGAGGACCTCTAGGCTTGGCAAGCACAGCTGATATGTATATTATTTTTCAGATAATATTT
70 TGGATTGTTTTAAATGGGATTGTTTTATATTAAACCAAAATAGCTTAAAGTTTGGAAATCTCATCTTGGCCCTCTGGCATCTT
AAAAATCAGTGATGAAAAATACTAACTAAATCTGAAGGTTTCAGGGAGGCGAGAGTTGTGGCACTTTTGTCTCAGAGGGGAGC
TGGAGTTTGAACCTACCAGCTCTTTCTAGTTGTGAATGAGGCTTGACCTTTTTTCTGAGGTGCTCGTGAGTAACAGGAGTGGCC
TTTGGGAGGAGTGCTTCTGAGCAGGAAGGCTTGTGTTTTAGAAACTTTCAACCCCTTGTCTTGAACACTAAGACTTGTG
TGGGTGCTTGAAGAGTAGGAAATAAACAGCTATTATATCTCGGCAACCTCGTGATTTCTGATGACATTAAATGAAATGAAACCTG
65 CCCCAGAAATCACCTCGAATGGCCAAACCCACTCTCTTGGGGCGCACTGTCTGACTCGCTTTCAGACAGTGTGTTGAAGCAGAG
AATTGAGACAGTGATGTGGTTAAGTCTCAAACTGCTGTTGAGGAATAAGATAGTTTTTGGGTTTTCTTTTTTGGTATGATG
ATACAGTAAATATCAGCATGAGCACTTATAGATAAAGTGTGATTCCCAATGATTTTGGGTTTCAAGTATTTCTTAAATTTCTTT
AGCTGCTCTCTGTCTGTGCCACTCCCTGCGGTCTGGCTGAGGAGCTTGTGCAAAACCCAGCTTGGTTCTTCACTCATGGGCGAT
ATTTTAAAGAGGCTTCTGAAATCAGCAAAACGTTTGTAAATGATTATCTTGTTTAAAGTTTTCAGAGAGCGCAGTTTTAGAGTTT
75 TTTTCAACTTAAACAAAGCCAGTGGGAATTTCAACAGACTTTACATGAACTTTAGAGTATTTTCTTAAATTTCTTTCTTT
TTTCAAGAAATTAATTTTGTGATAAAACACCACATATCCAGTGTGGAATAATTTAAAAATCAGAAAAACAAAAATGAAAA
TAAAAACATCACATTCTACCACCAGAAATCACCATTAGGCTCAGTCTTACCCTTTAATGTGTATGTGAGTGTGTTTATAT
TTTTTACCTAAATGATGTCTGTTATTTTGGGGAGCTTTTCAAGTATGTGGACCGACTGCTTCTTCTGAAACCCGTTATAT
TTTTGCTAGTATAAATTAACCTTAGGGTTTCTTCTCCTCAAGTAAAAATGATTGCTTAAAGATGAATTTTCACTCAGTGACA
CATGACTTAAATGACATCACCACATCATCATATAATTCAAAATAAGACTTAGCAAGTTCTTAATAGTGTCTTATAATAGG

316

CCAGGCCCTTTGTGGTTTCATAGCCTTATCTCTTAATTCTGATGCCAGCCTGCCTTCCCTTCCACCATTGACGTACCAAGAGTCAGA
 GAGGTGGCAGCGTGACCTGTATCCACACCACTGGTGAGCAGCCCTCCAGCATCACACCCAGACTTTCTAAGATGCTTGGTATCCC
 ACAGATGGGAGCCAAATTTCTTTAGGTGGGGAAAGAGAAATGGGAGCAGAGAGAACAGCCTGTTCACAAAGAAAGGAGAGAACCAA
 GAGTTTGGGATTAAGCATAAAGGTCTAATTAACATTTATTAGGTGCTAAGTGCACTGCCATGTGTCAACTCCTGTAATCCTTGAAG
 5 TAATCTCTGGGAGACAGGCATTTCACTTCTCACCTTACAGATGGGGGACAGAGCAGGAGGAGATCTTGAGAGGCTCCCATGGTCA
 GCAAGTGTGGTGAAGGATATCATCTGGCTGGTCTACCAGGTGCTCCATCTTCATCTATAAACTCTCTGTGCTTTAGTTT
 CTTCTATGAAACAGGACACCTATTTCATAGGGTAGTTGTGCGGATTAGTGATAAAGTGCTAAGAGTAATAGCTGGGGCAGAGTTAA
 TCCTATGTAAATATTGGCGAATTGTCTTAGTCTGTGCTGTGCTATAATGGAATACCATAGAGTGGGTAAATTTACAAAGAAAAG
 TATGTATTATTATGATTCTGGAGGCTGGGAAGTCCAAGAGCATGGCACTGGTACCTGGTAAGGACCTCCTTGTCTGC

HUMAN SEQUENCE - mRNA
 CGCTCGATCTTGGGACCCACCGCTGCCCTCAGCTCCGAGTCCAGGGCGAGTGACAGAGCAGCGGGCGGAGGACCCCGGGCGCGGG
 CGCGGACGGCAGCGCGGGCATGAACCTGGAGGGCGGGCGGCGAGGCGGAGAGTTCGGCATGAGCGCGGTGAGCTGCGGCAACCGGGA
 AGCTCCGCCAGTGGCTGATCGACAGATCGACAGCGCAAGTACCCCGGGCTGGTGTGGGAGAACGAGGAGAGCATCTTCCGC
 15 ATCCCTTGGAGCACGCGGGCAAGCAGGACTACAACTGCGAGGAGGAGCGCGCGCTCTTCAAGGCTTGGGCACTGTTTAAAGGAAA
 GTTCCGAGAAGGCATCGACAAGCCGACCTCCCACTGGAAAGACGCGCTGCGGTGCGCTTTGAACAAGAGCAATGACTTTGAGG
 AACTGGTTGAGCGGAGCCAGCTGGACATCTCAGACCCGTACAAAGTGTACAGGATTGTTCTGAGGGAGCCAAAAAGGAGCCAAG
 CAGCTCACCTGGAGGACCGCGAGATGTCCATGAGCCACCTACACCATGACAAACGCTTACCCTTCGCTCCAGCGCCAGCAGGT
 20 TCACAATCATATGATGCCACCCCTCGACCGAAGCTGGAGGAGTACGCTCCCGGATCAGCCACACCCGGAAATCCCGTACCAATGTC
 CCATGACGTTTGGACCCCGCGGCCACCACTGGCAAGGCCAGCTTGTGAAATGGTTGCCAGGTGACAGGAACCTTTTATGCTTGT
 GCGCCACCTGAGTCCAGGCTCCCGGAGTCCCAAGAGCAGGAGGAGGAGTGTGCGGAGCCTTGGCGTCTCAGACTGCCGCT
 GCACATCTGCTGTACTACCGGAAATCCTCGTGAAGGAGTACACCGTCCAGCCCGAGGGTGCCTGATCTCCATGGACATA
 CGTATGAGCGCAGCAACCTGGACAGGTCTGTTCCCTTACCAGAGGACAAATGGCCACAGGAAAAACATTGAGAACCTGCTGAGC
 25 CACCTGGAGAGGGCGTGGTCTCTGATGGCCCCGACGGGCTCTATGCGAAAAGACTGTGCCAGAGCAGATCTACTGGGACGG
 GCGCTGGCGCTGTGCAACGACCGGCCCAAACTGGAGAGAGACAGACCTGCAAGCTCTTTGACACACAGCAGTCTTGTGTCAG
 AGCTGCAAGCGTTTGTCTACCAAGCGCGCTCCCTGCCAAGATTCCAGGTGACTCTATGCTTTGGAGAGGAGTTTCCAGACCTCAG
 AGGCAAGAAAGCTCATCAGCTCAGCTAGAACCTCTGCTAGCCAGACAACTATATTTATTTTGTCTCAACAAACAGTGGACATTT
 CCTGAGGGGCTACGATTTACCAGAACACATCAGCAATCCAGAAGATTACCACAGATCTATCCGCCATTCTCTATTCAAGAATGAA
 AAATGTCAAGATGAGTGGTTTCTTTTCTTTTCTTTTCTTTTCTTTTGTATACGGAGATACGGGGTCTTGCTCTGTCTCCAGG
 30 CTGGAGTGCACTGACACAATCTCAGCTCAGCTGTACCTCCGCTCTGGGTTCAAGAGACTCTCTGCTCAGCTCCCTGGTAGC
 TGGGATTACAGGTGTGAGCCATGCACCCCAAGACAAGTGTATTTCATTGTAATATTGACTTTAGTGAAGCGTCCAATTG
 ACTGCCCTCTTACTGTTTGGAGAACTCAGAAGTGGAGATTTCAGTTGAGCGGTTGAGGAGAAATGCGGCGAGACAAGCATGGAAA
 ATCAGTGACATCTGATTGGCAGATGAGCTTATTTCAAAGGAAGGGTGGCTTTGCAATTTCTTGTGTTCTGTAGACTGCCATCAT
 GATGATCACTGTGAAAATTGACCAAGTGATGTGTTTACATTTAGTAATGCGCTCTTTAATTTGTTGATAGTTAGGTTCTGTCTG
 35 AAGACAGAGAAACTTGCCTTTCACTATTGACACTGACTAGAGTATGACTGCTTGTAGGTATGCTGTGCTCATTTCTCAGGGAAG
 TAAGATGTAATTTGAAGAAGCCTCACACGTAAAAGAAATGTATTAATGTATGAGGAGTGCAGTTCTTGTGAAGACACTTGCTG
 AGTGAAGGAAATGAATCTTTGACTGAAGCGGTGCTGTAGCTTGGGGAGGCCATCCCCACCTGCCAGCGGTTCTTGGTGTGG
 GTCCCTCTGCCCCACCTCTCTCCATTTGGCTTTCTCTCTTGGGCTTTCTGGAAGCCAGTTAGTAACTTCTATTCTTCTGAG
 TCAAAAAACATGAGCGCTACTCTTGGATGGGACATTTTGTCTGTCTTACAATCTAGTAATGTCTAAGTAATGGTTAAGTTTCTT
 40 GTTCTGCACTCTTTTGAACCTCATCTTTAGAGATGCTAAAATCTTCGCATAAAGAAGAAAGAAATTAAGGAACATAAATCTTAA
 TACTTGAATCTTGGCTTCTGTCCAAGTACTTAACTATCTGTTCCCTTCTCTGTGCCAGCTCCTCTGTTTGTGTTGGCTGTCCA
 GCGATCAGCGACTGGCGACATAAAGGAGGAGGAGCGGGGACTCCAGGCTGGAGAGCACTGCCAGGACCCCACTGGAAGCAGG
 ATGGAGCTCAATCGGAATCGCACTCAGTGGGCTGTTCTGCTTATTTCACTGTCTTATGCTTCTCTGCTGCTTCTCTGCTGCTT
 45 GACAGGGCCTTAAATTAATTTGCTTTTCCAAATGCTTCTATTTATAGAAATCCAAAGACCTCCACTTGCTTAAGTATACCTAT
 CACTTACATTTTTGTGGTTTGGAGAAAGTACAGCAGTACAGTGGGGCGTCACTCCAGGCGGTTCTCATACTACAGGATATTAC
 CAAGCACCTAGTAAGTGCCTGCTGATCCCTACATTACACAGTTCAGCCTTTATCAAGCTTAGTGAGCAGTGAGCACTGAAACATT
 ATTTTTTAATGTTTAAAGTTTCTAATATTAAAGTCAAGATATTAATACAATTAATATTAACTACAGAAAAGACAAACA
 GTAGAGAACAGCAAAAAATAAAGGATCTCCTTTTCCAGCCCAAAATCTCCTCTCTAAAAGTGTCCCAAGAAAGGGGTGTT
 50 TATTTCTCAACACATTTCACTTTCTGTAAATATACATAAACTTAAAGAAAAACCTCATGGAGTCACTTGGCACACATTTTCA
 TGCAGTGCTCTTTGTAGCTAAACAGTGAAGATTACCTCGTTCTGCTCAGAGGCTTGTGTGGAGCTCCACTGCCATGTACCCAG
 TAGGGTTTGACATTTCAATAGCCATGCAACATGGATATGTATTGGGCAGCAGACTGTGTTCTGTAAGTGCAGTATGATACATC
 TTATAGATGCAAGATTTTGGGGTATATTATCTAAGGGAGATAAAGATGATATTAAGAACTGCTGTTTACGGGGCCCTTACC
 55 TGTGACCTCTTTGCTGAAGAATATTAACCCACACAGCACTTCAAAGAAGCTGTCTGGAAGTGTGCTCAGGAGCACCTGTCT
 TTCTTAATCTCAAGCGGATGCTCCATTTCAATGCTTTGTGACTTCTTCTTCTTGTGTTTTTAAATATTATGCTGCTTTAACA
 GTGGAGCTGAATTTCTGAAAAATGCTTCTTGGCTGGGGCCACTACCTCTTCTATCTTTACATCTATGTGTATGTTGACTTTT
 TAAATTTCTGAGTATCCAGGTATGACCTAGGGAATGAAGTATGGAATAACTCAGGGTTAGGAATCCTAGCACTGTCTC
 60 AGGACTCTGAAAGGAACGGCTTCTCATCTTGTCTGTATAAAGTGAATTTGGCAAATAGAAATTTAGTTTACTCAGTGGAC
 GTTGTATCAACCAAGGCAAGTATGAGTGTGTTAAAGAGCACTGGGCTCATATGGAAAAATGTATGTGCTCTCCAGGTGCAATTTCTTGG
 TTTATGTCTTGTCTTGAGATTTGTATATTAGAAAACTCAAGCAGTAATTAATATCTCTGGAACACTATAGAGAACCAAGT
 GACCGACTCATTTACAATGAAACCTAGGAAGCCCTGAGTCTGAGCGAAAAACAGGAGAGTGTAGTCCGCTACAGAAAAACCCAGC
 TAGACTATTGGGTATGAACCTAAGAGAGTGTGCCATGGTGAAGAAAAATGTAATCTTACAGTGAATGAGCAGCCCTTACAGT
 65 GTTGTATCAACCAAGGCAAGTATGAGTGTGTTAAAGCTGGTCTTTGAGCGAGGCGATAAATACAGCTAGCCCCAGGGGT
 GGAACAACCTGTGGGAGTCTTGGGTACTCGCACTCTTGGCTTTGTGATGCTCCGCGAGGAAGGCCACTTGTGTGTGCTGTCACT
 TACTTTTGTAGTAACAATTCAGATCCAGTGTAACTTCCGTTTCTGCTCTCCAGTCAATGCCCCACTTCCCAACAGTGAAG
 TTTTCTGAAAGTGTGGGATTTGGTAAAGTCTTTTGTATTACGTATCTCCCAAGTCTCTGTGGCCAGCTGCATCTGTCTGA
 ATGGTGGCGTGAAGGCTCTCAGACCTTACACACCATTTTGAAGTTATGTTTACATGCCCGGTTTTTGTAGATCTCTCGATGTCAG
 70 GTGGATCTCCTTGTAGATCTGTATAGCCTGTTACAGGAATGAAGTAAAGGTGAGTTTGTATTGATTTCACAGCTTTGAGGA
 ACATGCAAGAAATGTAGCTGAAGTGAAGGGGAGCTGAGAGAAGGGCCAGGCCAGGCCAACCTCTCCCAATGGAATTTCC
 GTGTGCTTCAACTGAGACAGATGGGACTTAACAGGCAATGGGTCCTATCCCTCTCTCAGCATCCCCGCTACC

HUMAN SEQUENCE - CODING
 ATGAACCTGGAGGGCGGCGCGGAGGAGTTCGGCATGAGCGCGGTGAGCTGCGGCAACGGGAAGCTCCGCGAGTGGCTGAT
 75 CCAACAGATCGACAGCGGCAAGTACCCGGGCTGGTGTGGGAGAACGAGGAGAAAGAGCATCTTCCGATCCCCGGAAGCAGCGG
 GCAAGCAGGACTACAACCGGAGGAGGACGCGCGCTCTTCAAGGCTTGGGCACTGTTTAAAGGAAGTTCCGAGAAGGCATCGAC

5 AAGCCGGACCTCCACCTGGAAGACGCGCTGCGGTGCGCTTTGAACAAGAGCAATGACTTTGAGGAAGTGGTTGAGCGGAGCCA
GCTGGACATCTCAGACCCGTACAAAGTGTACAGGATTGTTCTTGAGGGAGCCAAAAAGGAGCCAAGCAGCTCACCCTGGAGGACC
CGCAGATGTCATGAGCCACCCCTACACCATGACAACGCCTTACCCTTCGCTCCAGCCAGCAGGTTCACTACTACATGATGCCA
10 CCCCCTCGACCGAAGCTGGAGGGACTACGTCCCGGATCAGCCACACCGGAAATCCCGTACCAATGTCCCATGACGTTTGGACCCCG
CGGCCACCACTGGCAAGGCCAGCTTGTGAAATGGTTGCCAGGTGACAGGAACCTTTTATGCTTGTGCCCCACCTGAGTCCCAGG
CTCCCGAGTCCCCACAGAGCCAAGCATAAGGTCTGCCGAAGCCTTGGCGTTCTCAGACTGCCGGCTGCACATCTGCCTGTACTAC
CGGGAATCCTCGTGAAGGAGCTGACCACGTCCAGCCCCGAGGGCTGCCGATCTCCCATGGACATACGTATGACGCCAGCAACCT
GGACCAGTCTGTTCCTTACCCAGAGGACAAATGGCCACAGGAAAAACATTGAGAACCTGCTGAGCCACCTGGAGAGGGGCGTGG
TCCTCTGGATGGCCCCGACGGGCTCTATGCGAAAAGACTGTGCCAGAGCACGATCTACTGGGACGGGCCCTGGCGCTGTGCAAC
15 GACCGGCCAACAACTGGAGAGAGACCAGACCTGCAAGCTCTTTGACACACAGCAGTTCCTGTCAGAGCTGCAAGCGTTTGCTCA
CCACGGCCGCTCCCTGCCAAGATTCCAGGTGACTCTATGCTTTGGAGAGGAGTTTCCAGACCCTCAGAGGCAAGAAAGCTCATCA
CAGCTCAGTAGAACCTTGCTAGCCAGACAATAATTTTGTCTCAACAAAACAGTGGACATTTCTGAGGGGCTACGATTTA
CCAGAACACATCAGCAATCCAGAAGATTACCACAGATCTATCCGCCATTCTCTATTCAAGAATGA

Table 12

MOUSE NOMENCLATURE
 ICSGNM Notchl
 Celera mCG18747

HUMAN NOMENCLATURE
 HGNC NOTCH1
 Celera hCG1780817

10 MOUSE SEQUENCE - GENOMIC

GTCTGGAGGTTTTATTGTCCCTGAGGGGGTGCCTTTTGGTTTGGGGGTATGATATGAAGAACCTGTGTCTGAGAGCGGAGTTGT
 AGAGAGTGGGAGCAGCAGCCAGCATCCTGGCATAGTCCCCTTGCTACAGGGCAGGAACCTGAAGAGAGAGAAAGCACACAGTCTCCA
 GTCTGCTCTGCTTCCCGCTCCACTGTGCTATTGATGTTTGAAGTGGGAAGAACCTGAACTCTTTATTACCCAGATGATGCAT
 ATTCATGACAGAAGCTGGGAGAGAAAAGCAGACCAGCCTCTAAATGAGAGTTTACAGAGTCTATGTCGACATCCCCCAGAGG
 CTGGGGGAGGGGGCTCTGCTGCGCCTGTAGGCTCACTTCGAGTGTAGACCCAGATTGAAATCTGCCTGGTTTGAATTCAGGCT
 GGTCTTGTCTCTAGCCTGGCCCCAATTAACAGTCATTATTATTTCTTTTATTGAGGTGAGGTTCACTTAGTATGTGAAGTAAC
 CCCTTTAAAGTGAGCGCTCCATGGCATGCTCCAGAGCTTACGTCATCCAGAAACCTCTGCCAGCAAGCAGCCACTGCACCTCC
 ATTTAGAGCCTGATTCCAGTTGCACCCACTGCCAAGGTCGGGTAGCCTGTGGCCATGAGAGATGAGGGCGGGAGCTGACTGCC
 CTACATGTCTGTCAACAGCTGCAGCGGAGCCTTTGTGGGCCAACGATGCCAGGACTCCAATCCTTGCTCAGCACACCGTGTAA
 ATGCTGGAACGTGCCACGTTGTGGACCATGGTGGCACTGTGGATTATGCCTGCAGCTGTCCCTGGGTTTCTCTGGGCCCCCTGCTG
 CTGACACCTCTGGACAACGCCCTGCTGGCCAAACCTGCGCAATGGGGGACCTGTGACCTGCTCACTTCACAGAGTACAAGTG
 CCGCTGCCACCAGGGTGTGAGTAAGGCTATAGGAGGTTGTGAACCTCACGGTTGGGACCTTAGGCCTGGGCCCCAAGGACCC
 TATCTTGTGTGACTGACATACTCTGGTACACTAACTTTATCCTCTCTGGATCAGAGTTAAGCTGGGATCTACTATCCAGAAAA
 ATCTTGGGATTCTCTGGAACTCTGGTCTTTTCAACCCCAACTATCTGATTTTGGCTGCCCTGTTCCAGGACCCCACTCT
 CACTGTTTCTGTGCGTAAAGATGAGTCTCATGTAGCCCGGCTTACCATCTCCTTGTGAGGGTGCCTCAGGTTTCCATTGCTT
 CTCTATGTGGGGTCCAGGAGACAGCTAGGTACAAATTTAGACTGCCATTCTACTTCTGTCTTGTGAGCAGTCACTTAGTCTCTT
 ATGACTTACAGTCTCTGTATGCAGAAAGATGGCCACATTCTGCAACAGATACTGAGCATCATGAAGATAACACTTTAGATCTATC
 CTTGGTTGGTACCTACATGATGTCCAAATCTGCCCTGGGTTACAGGGAGGCCCTGGCAACAGCTGACCTCTCTCTGCTGCCCTCCA
 GGAAATCATGTGAGCAGCTGACCCCTGTGCCTCCAAACCTGTGCCAATGGTGGCCAGTGCCTGCCCTTGTAGTCTTCAATACAT
 CTGTGCTGCCCGCTGGCTTCCATGGCCCCCTGTCAGGCAAGATGTTAATGAGTGCAGCCAGAACCTGGGCTGTGCCGCCATG
 GAGGCACCTGCCAATGAGATCGGCTCCTATCGCTGTGCTGCGGTGCCAGCCCACTAGTGGTCCCCTGTGAACCTGCCCTATGTG
 CCCTGCAGCCCCCTCACCTGCCAGATGGAGGCCTGCCGTCTACAGGGGACACCCACAGAGTGTGCTGCTTGTCCAGGTAG
 GTTCCATCTCAGTATGCTGGCATCTAGCCTGGTTGTCCATGTCCATGCGTGTCCACTGTCAAGCCCGAGGGATGCAGAAAGATT
 AATACCTTTTGAAGGGAGGCCAAAAGAGTTTATAGAGAAGGGCAGCAGCCATGGAGCCTTAGGTGTGGTATAAGAGCAGGTGAGGA
 TAGGGATACAGAAGTGAGGGGACACTCTCAGTGACACCACACAGTCTATTTCTGTCTGGGCCATCTACTGAGATCCAGTTAGTT
 TGGTGCATAACCTCCAAGCCTTCTTTCTGCTGATAAGAGTGCCTTCCCTTGGTATTTTCTTCTGCTGGGCTCCCCTGAGCCATA
 GCCAACTAATACCCACCATGTCAATACCCTGAGCCTCTTAGGGCAGGGAGCCAGCTGCCTTTACAGATGCTCATGAACCTGTTGG
 AATCCACATGTGACTCTCTGTATGTTACGGGAGCACCTGTCTGAGGCGAGTCCCTGGGTTTCCCCTTCTCTGGGATGGTAATT
 GAATAACAGGGTCTTGTAGGGCCTTAGGGGCTCAGCTTTTCTTACTTCTCTCTGAGTGTCTTCCACTGTGCTCAATGTCTCT
 GCAGGGGTGGGCTGTCAGGCACAGCCCTAGTCTTTCTGTTGCTGCTCTAACGATGGTAACTCGGTGATCTAAGGCAGCTGGAG
 CTGCGGCCAACCCACTTTTGGCAAGGGTGGGTTGGTCAACATACCAGGCCGTTGAGAGGAAGGAGGAGTGGGCTCAGGAAATAGG
 AATAGATTGGTTGCTGGGGGTGACCTCGGACCACTCCCTTGCAACCCCGGGGCCACCTTACACACTGAAAAAGGGAGTTCCCT
 TCTGCCCAAGCTTGTCAGAGCCAGCCTCAAGACTGCGTGCAGACACTGGCTTATACATTCTCTGAAAGTCACTGGGCAAGCTCGGA
 GGTAGCCGACAGCTGCTACACGCTTCCAGCCTCCCTGGGGGCTGGGACAGGATCTTCAAGCTCAGGAGCCGACAGCTGGA
 GTTCAGCTCTGTCTTGGTGGCCACTAAGACCTCAGCTGTGTAAGACCTGTGTGAGAGGCTAGACTGGGTCTGTCTGAGACTGA
 GAGAAGCCTTGTCTCAAGGAGCTGTGTAATGGAGCTGCCCAATCCACCTTAGGCAGGGTGGGGTGGGTCAACTCAGAGTGTCTG
 AAGATTGGGCAGGAGGAAGCAAGGACTGGGTGGGGTCCCTTACCTTAGCCGCTGGGTCACTCCCTGAAGAGCGAACACACTACC
 CTGTGCTGTGTGGAGACATGCTGTTTACAGTAGGGAGAAGTGAAATTTGTCCACCCAAATGTCTGTGAAGGGAGTCCGCTCTGG
 GCACAGTTATACCCACATTGGGCTCCCAGGTAGTATTACAGGTTTCTGAAGAATGTATGAATAGGTTGGACATATAAGAAAC
 TAAGATTGGGAACAGAACTTAAGCTGAGAGCTGACTGGGAATTAAGGCACTCTGGCTCCTGTATATCTACTCTCTCACTCTCA
 CRAAGCCCGTTTCCCTGGAGGAGCTGTATAGGCAGAGAAGGCTTGGCCAGGCTCCACATAGGACCTATGATCCCTTCTCCTCGC
 CCCCAGTGAAATCTTCTACACCTGCTCAGGGCCCTCCAGGCTCGCTTCTTCTTGGAAAGCGTCCCTGTGCTAGAAATAATCTCT
 GCACAGGCAGGGAGACAGCTATTGGTCTTGTGCTGCAACCTGGGCGGGCACTAGGCTCCAGATTGGTTTCTCCCTCACCCAGTAA
 GCCTTTTCCAAGCCTCCAGCTTCTGTGTGGTGAAGATGGTGGGGTGGAGGGGCATCTTGGAGGAGGAGCAGACAGGTGGGT
 CTCCAAGGGCAGGAGGGGTTCAAGGCATCCCCAGAGATGGTGAATAGTAACCGGCTGCAAGTTTGGCTGTGTGCCAGACTCGC
 CTTTCTGGGTGATCATTGACCCGGCAGGAGTTGAGGAGATTAATAGTAACTAGCTGCTGAGCAGGCCCTCAGGAAGCCCACTG
 CAGGCCACACCTTGGGGCCAGCCCGAGGTAGATGGGCTGTGTAAGAGAGATGGTTGCCCTGGCTGTGCCCTGAGGAAATCACA
 GGTTCGACTGAGCGGGCTGCTGGATCCCACTCTGGTTTCTAATCTAGTGTCTCCCAAGCCCCACTTTAGCTCCAGCAGTT
 TTAGGTATTCTGTGGCTGCCCCACTGATTAGTGTGGACAACCATAGAGTGCAATCTCTGAACTCTGTAGTGGTTTGTGGCAG
 AACCTCCAAGGACACTATGTTCTAGATCCCTGCTGTTGAGTCACTTTTACATAGCGACTTTCTAGAGAAGAGTGTACCTG
 TGGACACGGGAGTAGGGATGCCAGGAAGGACAGACAGATGCCTTGTCCAGAGCAGAACATTGAGGTTCCACCCAGAACTCTGAAGA
 TACCGGAGCCACCCGAGGCTCTCAGCAGACTTCTGAGGTGAGGCTAACCTGCTGCTGGCCCTGTCCACAGGTTTGTCTGGA
 CAGAATCTGTGAAGAAATGTGGATGACTGTCCAGGAACAACCTGCAAGAATGGGGGTGCTGTGTGGAGCGGCTGAATACCTTACA
 TTGCCGCTGCCACCGAGTGGACGGGTATGTATATGGGACTTGTAGGCAGCAGCCTTCCACTAACAAAACCTGCACACCGCGGAGT
 GGTAGGAAGGTCTGAATCTGTCTCCAGCTATGAAGCCCACTGCAAGACCCAGGGTGGCTGGTAGCATGGGAGCAGCAGCTTCT
 TGTGCTTCCAGTTGGAGTCAGCAGACTCAGCATCAGATGGTTTCTGTGAGCTATTAGCAGCTAACATCCATCCAGGCTCAGGCCCCC
 CACTGAGCCATACAGGAGCTAGCATTCTGGGCAAGCTACCAGGGATGAATACAAGTTGTCTCAGCCCCACAGCCAGAGCAGG
 AGCTCATCTGTAGCTGAGGTGTATGTTCTGTGACCCCTCATAGGTGAGTACTGTACAGAGGATGTGGAGCAATGTGAGCTCATG
 CCCAATGCCTGCCAGAAATGGCGGAACCTGCCACAACACACGCGGCTACAACCTGTGTGTGTGTCAATGGGTGGAGTGGGAGGA
 CTCGAGTGAGAACATTGATGACTGTGCCAGTGTGGCTGTTTCCAGGGTGGCACTTGGCACGACCGGTGTGGCTTCTTCTACTGTG
 AATGTCCGCATGGGCGCACAGGTAAAGTGGTGCAGGAATGTCTGGGAGAAGGAACTGGTTGGCTCACCACCCCTGGTGGAA
 CACCTGGGAGCCATGTATGAGATATATACAGATATATGTGTGTATATACATATATATATATATATATATATATATATATAT
 ATATATATCAGATATAGATACAGCTCAGATGTAGATACAGGGCTGGAATGCAGCAGTTGGTAGAGTGGCTGCCTAGCATGCAC
 AGGATACTGGACTCAATCCCTAGCACCACATAAAGTGTGGTGTAGGCTGCTGCTCAGGCCAATCCAGGGAAGAGTCAATC
 CAAAGGTTAAGGCCATCTTAGCTATATAGCAACTGTAGGTTGAGCTGGAATATGTGAGACCTGTTTACGGAAGGGATGGGAA

5 GAGAGAAAGCTCTGTCTCTTTGGCACCTCCAGCAATGACCCAGTAAGCCTTGCTGGACAGAGGCATCCTGGTGATCTGAACTTTGT
GGGATGCTTGAGTGAGTCAGAGAGATTTCATTCAGGGTGTGGGTGAGGATGGCCCTGCTGCAACAACTGTTAATCCCAGGATAG
GGAAAGCAGCACCCACTCACCGCAGCTGCCTTGTCTAGGTCTGCTGTGCCACCTCAACGATGCGTGCATCAGCAACCCCTGCAAC
GAGGGCTCCAACTGTGACACCAACCTGTCAACGGCAAAGCCATCTGCACCTGCCCTCGGGGTACACAGGGCCAGCCTGCAGCCA
10 GGACGTGGATGAGTGTGCTCTGGGTAGGTACAGATGCAGTGGCACAGGCAGCAGGAACGGGCTGGCTGTCACATATATGGGATGTG
ATCTGTCTGGAGAACCACCATTTTGTATGGCCTGGGCTGGGGCATTTGGGGTGTGGGGAGGCTGCAAGGCCAGATGAGCCCTCAT
CCGTGCCTCTTTACCAAGTGCACCCCTTGTGAGCAGCAGGCAAAATGCCTCAACACACTGGGTCTTTTGTAGTGCCAGTGTCTA
CAGGGCTACACGGGACCCCGCTGTGAGATTGATGTTAATGAGTGCATCTCCAACCCATGTGAGAATGATGCCACTTGCCCTGGACCA
GATTGGGGAGTTCGAATGCATATGTATGCCAGGTATGTCTTATGCCATTTCCACCATGGGGGTGCTAAGAGCAGGCAGCAGGGG
15 AATGAGTCAAGGCTGCATAGCTTCAAGTAACATTTCTGTATGTTGGTAGCATCTGGGAAGCCGAGGCCAGGATAACAGGACAAA
GTGGAGAATGTACCCAGAGTTGGGTGCATAGACTCAGTAGATATAGACATGAACACAGTGGGCACACTACGCTATGAGGGAG
GGTTATTCTCTCCCAAGTCTTCAAGTGGGGCTCTAGAAGGACCTACCGAAGCCGCTCTCGGTCTCACCATCTCCCGTCCACAGGT
TATGAAGGTGTATCTGTGAAATCAACACGGATGAGTGGCCAGCAGCCCTGTCTGCACAAATGGCCACTGCATGGCAAGATCAA
TGAGTTCGAATGTGAGTGCACCAAGGTGAGGCCACTACTACCAAGGACCCGATCTCTCATGATCTCTCCAGACTCTTTG
15 AGGGAGGACTTGAGTTGACTAGGGCTTTTTCAGGCTTTCTCAAAAGTAAAGGCCACGTGAGCAGTGGACGCTGTAGGGGACCT
GGCACCAGAAACCCCTTACTAAGGAGGGAAGGATGGGCAGGAGCTGCAGCGCTCTAAGATAGGAGAGTCCACCTGCTTGGCTCT
TGCTCTTCTGATGGTGTGAGGAGTAAGGACATAGTGTGGGGATCTGACCTCTATGCTGGGAAGGACTTGGAGGAATGAAGAG
GGGACCAAGTCTGGGAATCTGTCTTCTGCTACTCCAGGGCTGGACAGGCCCTTGGCCCTTCTGAGATGAATAAGCCATCTCT
20 AGACTTGGTCCAGCTAGGGAGTCCCATTACAGCCTAGTGCAGCTGTAAACATAGCAACAGAGTCTATTAGGAAAAGGCCCT
CTGTTTGGGCAAGGAGGAGCCACTGAGCAGTGTAAACAGGAGCTGATTAGAGGGGAGGGTGAAGGGGAGGATATAAGGG
CTGGTTGAGCTGGAGTTAGTGGCCCTGTGATCAAGTACCTCTAGGGAGCCATGTGAGCAGACATTTCAACTTAAGGTTT
GTGGGTAGCAACCAAGGGTTAGGATACTGTGAGATATAACCATCTCGTCTTCCCTGGCCACAGGCTTCAACGGGCACCTGTGCCA
GTATGATGTGATGAGTGTGCCAGCACCACATGCAAGAACCGGTGCCAAGTGCCTGGATGGGCCCAACACCTATACCTGCGTGTGTA
25 CAGAAGGTACAAGAGGCAGTGCAGATCTGGGGAGGGAACTCTTGAAGCTAGATAGTGTGAGAAGGGCAGGAACTGGGGAG
GCCTTAGTTTGGGGCCATATAATCTGAGAGTCAGAACTTAACTCCGCTTGAAGTCCAGGCAGGAGTGTGAGAACATCCCTGGGT
ATGTGATACCCACATCCATGCATGACCCAGCAGTGTCTTGGGCTGCTCGGTGGTTTGGCAAGGTGTGGCCAACTAAGTGTGTA
GAGTGTGACCTGACCCCTGACCCCTGACCTATGTTCTGTAAAGGATGTTGTGGCCACCTTTACCTGCTGTGCCAGCCAGGCTACACAGG
30 CCATCACTGTGAGACCAACATCAATGAGTGCACAGCCCAACCGTGCCTGAGGAGCCCTGCCAGGACCGTGACAACTCTTACC
ACATGTCATGCTGCGCCCTAGGGCCAACTGTGAGATCAACCTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
TCTGCTTATGCTCAAGGGAACACAGGTGACTGGCCGAGCTGGCAGTGGGTGGAAAGGGTGAGGCCAGGCTTGGAGCTGAGC
ACAAGATTGATGGCTACGAATGTGCTGTGAACAGGCTACACAGGTGAGTGGCTGAAGGCAGAGGTGAGGTCATCCCTAGAGTC
35 TGGGAGGAGTGTGGGGCTAGCCAGGGTCCAAGGGCTGGATGTCAAGCTGGGTGTCAACTACCCAGATCTTGATCTGCCAACCA
GTAGAGGTATCTATCATAAAGACTGGGTGGCTCCATATGCTCTCTTCCCTGTGAGTGTGAGGCTGGCCCTGAGCAGCTTAA
GCCCCAGTAGCTGAAGTGGGTGGCCAGAGCTCCGAGGGCAGGCTTTGGATATGTGTTAGATCTGATAAAATCCTTAGTTTCT
CTGAGCACCCAGGACATTGTCCACAGAGGATAGAAGAGGATGGGTGGTCTCAGGCTGAGGTAAAGTGGGCTGCAGAGTGACTCA
40 GTTGGTAAGGTGTTGACCTAGCATGTGTAACCCCTGGGTTCACTCTCCTGCCATGTTAACCAGATGCAGTGGCATGACATCGTTG
TAACCTAGCACTCTGACATTGGAAGCGAGAGGATCAGAAGTTTAGGTATTCTCAGCTACATGTGAGTTTGTGGCCAGAGCTGGAT
CACATGAGGCTCAGAAGCTACTGGCACTACGGTGTGTAACCTCATGATACATAAGGCACCTTACTATCGCTCAAAGTTTCATAGA
TTAGCACAAAGGGGAACTTAGACCAGCTAGGTCTAGCTCTGAGGAGGGTAGGCTCTGGGTGGCAGGCTGGAACTGAGCCCTT
45 CCCACCCACAGGAAGCATGTGTAACGTCAACATTGACGAATGTGCGGGCAGCCCTGCCACAACGGGGGCACTTGTGAGGATGGCA
TGGCGGGCTTCACTTGGCGCTGCCCGAGGGCTACCATGACCCACGTCGCTGTCGAGGTCAACAGAGTGAACAGTAACCCCTGC
ATCCACGGAGCTTGGCGGATGGCTCAATGGGTATGGCAGTGAACCTGAGTGTCTTCCAGCATCCCTGGGCTGTATCCTCATTTGGC
GGGTGAATGGGTGCTCTGTGAGACAGTGTGAGGTGAGCCCTAGTGTCTTCCAGCATCCCTGGGCTGTATCCTCATTTGGC
50 TAGCATCAGCTCAGGATATAGACTCTAAGCACACTGTGGCTGCTGAAACAGTTGTCTGATACTGTGGTGACAGCAGCCCTTGTGCA
GTGTGTGGGGACGAGGAGATTACTAAGGTCTCGTTAAACATTTAAAGTTTATACAGAGGGTCAAGTTGTCAAGGCTGGTGT
GTTCCAGTCTGGAACCTTGCACGCTCTTGGGCGAGGTGGGTACCTCCAGCCAGTGGATGATGTGGCCTTGTCTCAGACTGGAA
CTGTAGTTTAGCAGGAGAGCTCTGAGCCAGGCTACAGCTCAGGCTCTCCGTAGGTACAAGTGTGACTGTGGCCCTGGGTGGAGT
55 GGAACAACTGTGACATCAACAAACAGAGTGTGAGTCAACCTTGTGTCAACGGTGGCAGCTGCAAGGACATGACAGTGGTTA
CGTATGCACTGCGGAGAGGCTTCAAGTGAAGTGTGGGGGTGACACAGGAGTGGGTCTTCCCTTGGTCTCTTTCTCGGTCT
CACCTGATGAGCTAGCATTTCTCAGGCAAGATCCTAGTTCTCTTGGAGAAAGGCATAGGGCAGAGGCTCTGGCCACCTCTCTCT
GCTCAACTTCTTACAGGCCCTAATTGCCAGACCAACATCAACGAATGTGCCCTCAACCCCTGCCTGAACAGGGGACCTGCATTG
60 ATGATGTCGCTGAGTACAAGTGCACTGCTCTGCCATACAGGTACGAACAGCCAGGAGTGGAACTGGCTCTGGTGTAGCT
AGTGGAGCTAAGAGTATATGGGCTTACAGGCACTGAAGAAGGTTCTGTCTCTCGCTGAGGGTCTTAGGTCTCAGACTGGAAGT
TAGTTAAGCAGGAAGGCTCTGAGCCAGGCTACAGCCAGGCTCTGGGCTGGGGATAGTACCAGATGGGCAACACAGAGGA
70 TGCTTAGGAGAACTCCAGCCGCTGTGTGCGGGTGTATCTGGTATGTCTGGAGTGGGTGAGCTGGACTCTCCAGAGAAA
GTCTGGGAGGCTGACTGGTAGGTACTGCATGGATCAGGGTCCACTTGTCTGTGCTCTGGGGCCCTGGCTGCCCTCTCTGCTG
GCTGGGCTGGGATCTCTTGTATGGCAGCTTCTTGTGTGAGGAGACAAGGAGCCCTCTGTTAGATGAACAGAGGCAGCTCCTGCC
ATGGCTAGCTGCTGAGGAATGGCGAGAAATAGACCCCTGCCAGGAGATGTGCATTGAACATGAAGGCTGACCACTGGCCCC
CAACCTGCAGCTCCCAATACTGCCACAGAGTACTGGTGGCTTCTGCTGCTGCTGCTAGGTTCTGGACATAGCAAGTGGGTCTGT
75 GAAGGTGGAGGCCCTTCCAGTGTTCCTATGATGCTGGCAGGATGCTGTTTCTTTGACAAAGTAAAGGGCCTGGATTTTGTCTC
CTGTGTTGGTCACTGAGGAACTGTGACAGCCAGGCACACCCATGTTCTTTGGTCTTGTGCTGCTATCGGGGCTAGCGGGAGGA
GTCAAGCCGCTGACCAAGCTTCTGCTTCCCTTTCACAAATGTGCGGAACTCTGTCAAAGTCTCTGTCTGCCAGGTACCCGTG
GAAACCGATAGAGAGAGGCGCTGGAGAGTCTCACCAGTGGGCTGGGGACATGGTGGGAGACAAGGAAGATAAGGTTTCTTGTCT
65 TAGCTCTGGAGCCAACCATGGCCATAAACAGGAAGCTAAGTGGATGCAAGGAGTCACTGGGTTACTCGTGGCTCCCCA
AGCGGTTATCAGATTTCACTGCCCTAGTGTGAGGCTGCACCCCTATGTTCCCAAGTAGGATAGTCTTGGGGTAGCCAGTAGCTC
TGTCTCAGGAGTGAAGCTGTGTGACCTAAAGCTTCAAGATCAGCTCAAGGATTTTCTGGAATGGGGAGCAGGCGAGGTTCTCTC
AGGCTCAACACCTGTTATAGTAGGGTCTTGTTTTGGGTTTCTGGTGGGCAAGGCCAGGCTTCTCATGTGGAGCATTTGGGAG
70 ATGAGAGATGGCTTCCGGGACTACATAGATGCTCATGGAGAAAGAGTGTCTGTGAAACATGAAGCTGTTTCTGTAAGAACAGG
TACCTCTAATGCCATAACCCCAACATTGGGAGCAGAGACATCTTGAAGCTCTCTGGCTGGCCAGCCTAGCTAAGATGGCAAA
GCATCTGATTCACTGAGACTCTGTCTCAAGGAATAAGATGCGGGTGGTAGAGGACCTGATATCCGTCTCTCTCTGTCATA
CACTCTTACACACCTGTCAGTAATGTCATCTCTCCCGGATCAGAGTCTGGCTGGCCAACTCATACAGCATCTCTATACCTACCCCG
75 TCTAACCTCTGTGTCAGTAATGTCATCTCTCCCGGATCAGAGTCTGGCTGGCCAACTCATACAGCATCTCTATACCTACCCCG
CCCCCTTTATGGAAGACCTATGGGCGAGGCTCACTGGGTTCTATCTTCAAAATCTTCTTCTAGGAGCCAGTGTGAGGTG
GTGTTGGCCCCATGTGCTACAGCCCTGCAAAAACAGCGGGTATGCAAGGAGTCTGAAGACTATGAGAGTTTCTCTGTGCTG

5 TCCACAGGCTGGCAAGGTGAGGCTTGCCCTGGTCCACAGGCTGGGACAAGGATGGTGGAGTGGGAAGTCAAGGGCCCTGGCCAGC
CTGTGGGGCAGTCTCGAGAAAGGAGCCCATCAATGCTGAGCTACCTGCTCTGGGAAGCTCTGGGAAGCTCTGGGAAGCTCTGGGAG
CAGGAGATGGTCTCTCCATTCCAATCCATATCTCTGTTGGCCAGAGGTCAAGGGGAGAAGCTCTGGAGATAAAGCAGACAGCT
AGGACAGAGGCTCAGAGGGTGGGGCAGGTAACCAATGAGTTTGTCTTACAGGTCAAACTCGGAGGTTGACATCAATGAG
10 TGTGTGAAAAGCCCATGTGCGCATGGGGCTCTGCCAGAACCAATGGCAGCTACCGCTGCTCTGCGAGGCCGCTATACAGG
TCGCAACTGTGAGAGTGACATCGAATGACTGCCGCCAGTAAGTGGTACCCAGCTCTGTCATCTATGTTGGGTGCTCTGTT
CCTAAGCACACATGACAGGGAGCTGCTGAGAGTCTGAGGTGGAAAATAGCCCTGGTGGCCCGGAGTCAAGGAGCTGTGGATAGC
15 TGTGCCCTCAGCTTAGTCCACTTGCCCTGTGCTTAAAGAGAGACAGGCCAGAGGCTAGACAGGCCAGGAGGAGGCTGTTGAGCATC
AGTGTGTGCTTCTCAGGGCTTGCTGCTGAGATTCCAGCCAGTTGAGTGATATGGAGCAGAGGCCAGGCACCTTCAAAATGA
TGGCATGGGGCTAGTTGTATTCAACCTTGACACTCGGCCCTTGTCAGGACCCATTGAGTTGTGTAGGGCTTTAGAGATGCCCTGCG
ATCCTGAGTCAAAGCTAAAGGCAGAGAGAGATTGAGGGAGGTTCTGCTGGCACCATTAGTGTGTGTGTAGGGGAATGGGCTTCCC
TATGACTGCTTGGGCTGAGGGAAGATGTATGCGGAGCAGATTCCAGGCTCAGTGTGGATGGGCCCTGTTGACTACTGTC
ATCAAGGCTTGCTGTGAGCACTTGCCACCCATACCACCTTCTCAGCATCAGGTCCCGAAGCATGGCCAGTGGCCCAATGAGCT
CATCTTTCTGCTCCAGACCCGTGTCAATGAGGGGTTCTGACACGATGGCATCAACACAGCCTTCTGCGACTGCTGCCCGG
20 CTTCCAGGGTGCCTTCTGTGAGGAGACATCAATGAATGTGCCAGCAATCCCTGCCAAAATGGTGGCAATTGCACTGACTGTGTGG
ACAGCTACACATGTACCTGCCCGTGGGCTTCAATGGCATCCACTGCGAGAACACACACCTGACTGTACTGAGAGGTGGGTCCCA
GCCCTCAGCTGAGACAGGGAAGAAATGGACTGTGGAAGACAAAGTCTTGACAGCATGGCATCTCAAGCTGGTGTCTGCCCAGC
CCAGTGGGCATACAGCACTAATTGAAGTGAATCCAGCGTTGTTCAATTATGTTGAGTATCCCTCCTAAAGGGGCTTTGTGACCT
CCAGTGACTTAGAACAGGAAGTTTGTGAGAGGAATGGGGAATAGCCCTCTATCAAAACAGAGCTTTGTAATCTGTCTTAGTT
25 CCCCTTTTGCCCTGGTGGCAGGAAGCTTAGAGTTAAATCAATCTCAAGCCTGGTTTGTGATGCGCTTCTATAGTGTCTTATT
TGCCCTTGATTTTGTCTCAACCAACAGCTGTCTATATGCTATAAAATCTCTGCTGCTGATTTGGGTATTGTGGCCAGGTAGG
CATGGAGTTGTCTCTGCGCAGGACCTTAGGGAATCCTCAGTCTTCCCTGCTTCTCATCTGCTCTAGCTCCTGCTTCAATGG
TGGTACCTGTGTGGATGGTATCAACTCCTTCACTGTCTGTGTCCACTGGCTTACGGGCAGCTACTGTGCATGATGTCAATG
AGTGTGATTACGGCCCTGTCTGACGCTGGTACCTGCCAAGACAGCTATGGTACTTATAAGTGTACCTGCCACAGGGCTACACT
30 GGTCTCACTGCCAGGTGAGCTGAGGTTACAGGATGACCCAGAAGGCCCTAGGGCTCTCCAGTGCCATTGGCCAGCCCTGGGCC
ACACTACCTCTCAGAGGGCCAGGACACAGAAGCAGAGAGGCTCCTCGTGTCTCATGTTGGTGTGAGCGAGATGAACCCACATC
CTCTGGGGAAGTCCCAAGTTGGGTGCTTCTGAGGGAGACAGGTGGGCATGGGTGCCAGCCAGGCTCTTCTGGAGTGCATTATGT
GGCCATCTGTCTGAAGCAGCCTGGGGCAGTGCTCACTTCTGGTGGAGGATGTCCAAGGGAGGTAGCCAGTGGGTGTGGAGAGCC
TTGAAGAGAGCAAGGAAGACGTGGAGGCCAGGCCTATGTTGTTGCGAGGGCGGGCAGTGTGTTGTGAGTCTGTGCTGGGATTTC
35 TAGGTGATATTCTTCTGAGATGGTGGGGGTGGGGGTGGGGAAGTCAAGCATAAATGCCCTTATCCAGTGGCGCTCAGCCTGT
GGGTGATGACCCCAATAGGGGTGATATATCAGATATCTGCTATTTTGTCTACATGACAGTAGCAAAATACAGTTATGAAGAAG
CAATGAAATAATTTTATGGTTGGAGGTCAACCAACAGGGAATATATTAAGAGACTGCAGCATTAGGAAGCTGAGAACTGCT
GTGCTTCTCAGAGCCAGGACAGGACAGGGCAGGAGGTGCCCTAGCAGTCAAGTGGTCAAGGAGAAGTAAACCGCCCTGTCT
CCTCAAGAACTTGTGCGCTGGTGGGACTCGGCTCCCTGCAAGAAATGGTGGCAGGTGCTGGCAGACCAACAGCAGTACCTGTGA
40 GTGCCGACAGCGCTGGAGTGGCGTCACTGCGAGCTGCTCAGTGTGCTGTGAGGTGGCTGCACAGAAGCGAGGTAAACCAACCG
CCGGGCCCACTGTCTTGTCTCAGGCTCAGCTTAGGCCAGGAGTGCCCGGTGCTGCCAGGTCAAGTGACAAATGGGCAGTAGTCC
CGAAGATCGGAGCCAGGCTCAGCTCCTTCCGCTTCTGTCCACAGGCATTGACCTCACTCTCTGTGCGCAGTGGAGGGCTC
TGTGTGGATGAGGGAGATAAATCTAGTGCCTGCGAGGCTGACAGGCGAGCTACTGTGAGGACGAGGTGGACGAGTGTCT
ACCTAACCCCTGCCAGATGGAGCTACCTGCACTGACTATCTCGGCGGCTTTTCTGCAAGGTGTGGGCCGTGATGGGTGGCGGG
45 GAGGTATCAGCGTGAGTGTGCTGCAAGGGAGGGCTTTTCTGAGGAGTGTGATGATGAGGACATGAGCAGTACCTGTGCA
GGATCCGGTCACTTACAGATGTGCTGAAGGAGGAGAACTATGCCAAGCAGTGGCTTAGGGCACCCCTTCTATATGTTTCATG
GTACCTAATACCTGCTCCAGACCTCATCCCTGGGGGACAGGTGTTGCCCCACACACACACCTTGGACATTTATTTAACTTA
CTGGGTCTACTTGGGTGGAGCCCTCGCTGCAAGGTGGGACAGTGTAGTCTAAGTGGTATATGGCTGCAAGTGAAGGACA
TGATACCACAACCCAGCTAAGCTGTGACCTGTGCCATTTCTACAGTGTGTGGCTGGCTACCATGGGTCTAAGTGTCTCGAGGAGA
50 TCAACGAGTGTCTGCGAGCCCTGCCAGAAATGGGGTACTGCTGATGATGACCAACTCTTACAGTGTCTGCGCCCGGGGG
ACACAGATAGACACTTTACAGGCCACAGACTGGGCGAGGATCACTCAGGTGATTGAGAGCTGACAGGCTGAGGATGAGGA
ATCTCAGAAGGGAGGTGGGCTCCAGTGGCACTGTGCTGCCCTCCCCCGGGCCCCAGGTCTAAGTGTCTGAGTGGGCTGCACA
GGACAGACACAGTCAAGCATATCCGACGGTGTCTGCTGCTCACTCTGAGGTGTACACTGTGAGATCAATGTGATGACTGCCATC
55 CCCCCTTGACCTGCTCCGAGCCCAAGTGCCTTCAACAAATGGCACCTGTGTGGACAGGTGGGTGGCTTACCTGCACTGTC
CCACAGGCTTCTGTCGGGGAGCGGTGTGAGGGTGTGATGATGAATGTCTTCAACCCCTGTGACCCAGTGGCACCCAGAACCTG
TGTGAGCGTGTAAATGACTTCACTGCGAGTGCCGGGCTGGCCACACTGGTGGCTGGCTGGGAGGTGGGTGCAACGGGTGGGT
GGGCAGGTCAACAGGATGGCTCCTTACTGTCCCTTCTTACACAGGACCGCGTGTGAGTCACTCATCAATGGCTGCAGGGGCA
AACCCTGCAAGATGGGGGTGTCTGTGCGGTGCTTCAACACCGCCGCTGGATTCACTGTAGGTGCCCTGGGTAGGTGCTCCT
60 GGCCCTGTGCGGCTGCAAGGTGCCAGGTCTGAGGGTGCCTGAACCCCTGACCGACTCTTATGGTGGATCTGTCTCCACCCAGCCT
CACTGTGAATAGTCAAGCTGAAGACCTTAGCAGAGGCTAGGGTCCAAGCCACATGCTTCTCGTGTCCATTCCCAGCTCGTTTA
TAAACCCGAGCGGGCAGCATCCATACATGCTTGTCCAGTGTCTGACGCTCAGGCTGAAAGATTGCTTGTATTTGAGGTA
CCTTAGGCTTCAACAAGACCTGTAAAGGTTTATTTCTGCTGTGCTATGTTGGGAACCTCACATGCTGGGCAAGTGT
TTGCCACTGTGCTTAGCCCAATTTTAAATAGATGTTATTTTAGAGCGGTTTAGGTTTGATGAGAACTTAGCAAGAGGGCC
AGGTCCCAACCTGAGGCGCTTCCCTATGTTTGTGCTGCTGCGTGGGAAGGTGTTGAGCTGGCAATATGAGTATTTGCTT
65 GGGTGTGACATCCAGGGATCTGTACACATAAATGTACCAGCATCAGCTTGGGTTTCAATGGCTTAAAACTCCTAGGTTCTC
CCCATTCACCTATCCCTCAGTTTGAAGCCCTTGGCAACCTGACCATCTATGGTGAGATGTTTCAAGGGTCTGTTATTTGGGGC
AAGGCCATAGACACTTTACAGGCCACAGACTGGGCGAGGTCTTGTGCGGGTGTGATGGTGTCCCTGATTGAATGCACCATC
CTCTCTCCACCACAGGGCTTGGAGGTGCCACATGTGAGAATGATGCCCGCACTTGTGGCAGCTTACGCTGCTCAACGGTGGTAC
ATGCATCTCGGGCCACAGTAGTCCCACTGCTATGCTGGGATCCTTCAACCGGCTGAGTGCCAGTTCACAGCCAGCAGCCCT
70 GTGTGGGTAGCAACCCCTGCTAATCAGGGCACCTGTGAGGCCACATCCGAGAACCCTTCTACCGCTGTCTATGCCCTGCCAA
TTCAACGGGCTACTGTGCCACATCTGGGACTACAGTTCACAGGTGGCGCTGGGCGGACATTTCCCCACCGCAGATTGAGGAGGC
CTGTGAGTGTCTGAGTGGCAGGTGGATGAGGCAATAAGGTCTGCAACCTGCAAGTGTAAATACAGCATGTGGCTGGGATGGTG
GCGACTGTCTCCCTCACTTCAATGACCCCTGGAAGAACTGCACGAGTCTCTACAGTGTGGAAGTATTTAGCGACGGCCACTGT
GACAGCGAGTGCAACTCGGCGGCTGCTTCTTGTGGCTTCAAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
75 TTTCTTGAAGTCCCAGGCTCAGGATGTACCGGAGGACCTAACCAACACAGGCTCCTGAAGCAATGTCTATCCCTGCCCAT
TGCGAGTCCGCAAGCACATTTCCAGATCTGGCTATTCAAGGTATGGGTTGAGGTCCACAGGCTGGGATGGGACTGAGTGATC
CTATACCTCTCAGCCCTGTATGACCACTGTCAAGGACACTTCAAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
ATGTGAGTGGGATGGCTAGACTGTGCTGAGCATGTACCGAGCGGCTGGCAGCCGGCACCCCTGGTGTGGTGGTGTGCTTCCAC
CCACCACTACGGAACACTCTTCCACTTTCTGCGGGAGCTCAGCCAGCTGTGCAACCAACAGTGTCTTCAAGCGTGTGCG
CAAGGCCAGCAGATGATCTTCCGTAATATGGCCACGAGGAAGAGCTGCGCAAGCACCAATCAAGCGCTTACAGTGGGTGGGC

CACCTCTTCTACTGCTTCTCTGGTACCAGTGGTGGGCGCCAGCGCAGGGAGCTGGACCCCATGGACATCCGTGGGTGAGTGTCCAGC
 TCCTGCTGTGTGGGCTGTTTCCAGTGTGTCCCTGGGTTCTCTAACACAGCTTAACCTGGAGGTGAACCTCAGGGGAGGTAGTA
 TTCACCTTATTTTATAGTCAGAAAGCACCTGGGATGAAGAGGCGATCCCTCTGATGAGGACTTGGCAGGCCTCAGGGTTGGCCAG
 ATGTGATTTTTCAGGCCCCACTGTGTACAGGTGTGGAGACCAAGCTGATTAAAGCCTCCAGGGTGTCCCCTGGGGCTAAGTCATC
 5 CTAGACCAATCCTGACCTCAGTCAGTCACTACAGCCCTTATCCCTACTACAGAGGAGCAGTGAAGGGTACAGAAAGGCATCTTGTCTG
 AGCCTGGAAGGCTGAGGAGCCGAGGAGGCACAAATAAGAGCATCTCTGGATGCTGCACAGAGCCATCTGGGGATGGGACGGGAA
 GCACAGCCAGGCATTTGGAGGTTCCAGGAGCCTTCGCTGTGGGCATCTGCTGGTGGCACCTCAGTGTCTCTGACCCACAGTGG
 TTCTCGTCTGGTCTTCTTGTCTGGGACTGTGGTGAAGGTGAGAAATTAATTGTTTCTGGAGGCTGTAGAATCTCTTCTG
 AGAGGCCAGTGACTGAGAGTTGGTGACTTGGCTGGCATGAGAGAGCTGACTCTCTGGCATCTGAGCCTGCTGTACCTCAAGCTAC
 10 ACCATAGGGAGTCACAACTGCATCTCTGAGTCTCTGTGGGGCCCCAGGCATGCTCTCAAGAGGGCATTGGATGCCTAAAGACTAT
 TCTTTGAAGTAAGGAAAAGGGGTGCTGTGCACCTAAGGGGCAAGGCTAGACAGTGGAAATGACCCCCGCTGAGTGTAAACACTGGG
 GCAGCAGGGAGAGTGTCCCATTTGGGGGCTGTCTGTCTGATAAGCCCTGTGGGTGAGGGTGTGGGCTAGGAGTCAAGAGTGTGT
 GTAGGCAGTGTACTGGGTGTATCTAATCTCACTGTGCCATGTGTGTCTCAGCTCCATTGTCTACTCTGGAGATCGACAACCGGCA
 ATGTGTGCAGTCATCTCGCAGTGCTTCCAGAGTGCCACCGATGTGGTGCCTTCTAGGTGCTCTGCGTCACCTTGGCAGCCTCA
 15 ATATTCCCTTACAAGATTGAGGCGCTGAAGAGTGAATCAGGGGCTGGAGGGATGGCTCGGTGGTTAGAGGACTGGGCTCTT
 GCAGAGGACAAGGGTTCAAATCCAGCACCCACGAGCATCTTATAACTATGTGTAATCTTAATCCAGGGCATCCAACTTTCT
 GCACCTCTGCAGGCACAGGCATGCACAGGGTCTGACGTACATGCAGGCAAAACACCATACACATTACATATTTTAAATGAGT
 TCCCTACCCCGACAGCCCTGCCTCTCAGGGATGGGTTCATTGGGTGGCGGGTACAGGCAGGGCGGTCTCTCACTCTGTGGCCA
 GCTGCCATTCCAGCTCAGGAAGTGCTTTTCTGGAATTTTTCCTCAAGGCCTTCCCTCCCTGTGGCTAGTGGAGCGGTAAAGTAAA
 20 AGCTGTCCCTCAAGATGTATACATATACCAGAAAGTATGGAGGAGTCTTCTCTCTCTCTCTTCTTACCCTGATTTTCTTGTG
 TTGGATATTATTTCAAATCATTCTAGAGTTTCTGTGTGTATTATTTTAAAGAGAGAGAGAGAAATGATCGGTGTCTGT
 GAAGTGTGAAGTTTGTATCTTGAAATCCCCCTAAATCTTGTCTTAACAGCTCAATGCGAGCGCAGTGATTGAAGTTCGCTA
 ATCTCTCTCTGAAAGGGGAGAGTGAAGTGAAGTGTCTCCAGACAGATCAGCTGGTGCAGGAGAGAAATTAGCGATAGTTTGAAT
 25 CTGATTAATCAGGTAGAAATGACCTTATTTTGGGGGTGGGATGGAGGAGTGGGTGAGGAGGACCGGCGGTGGAGCCATCC
 TCCGCCCCCCCGCCAGCCACAGCATCACACGCTGACGAGGGGTGCTTGCCTGCGGCCCTGCCCGCAGGTGAGCGGTGGAGCC
 TCCGCTGCCCTCGCAGCTGCACCTCATGTACGTGGCAGCGGCCCTTCTGTCTCTTGTGGGTCTGGGGTGTGTGTGT
 CCGCGAAGCGCGCGGCGGAGCATGGCCAGCTCTGCTTCCCTGAGGGTTCAAAGTGTGACAGGCAGCAAGAAGAGCGGAGAGAG
 CCCCTCGGCGAGGACTCAGTCGCTCAAGTGAGTGGACACTGTCTCCACTGTGTGTGGGTGAGTGAAGTGGCAGGGTGTGGGGG
 30 TGCTTAGCTCCAGAGGCCATGGGCCATCCATCTCTGCTTACCTAAGCCCTTCTGATGTAGAGGATGCCCATATGAGCT
 GTGGCTTCAAGGCATCTCTGGAGTACCTGCTCAGTCTCCCTACCCCATACCCAGGCCCTGAAGAATGCTCAGATGGTGTCT
 GTGACGACAAATCAGAAAGAGTGGGGAGACGAAGACTGGAGACCAAGAAGTTCGGGTGAGTCCCGCAGGCTCCCAAGCCCCC
 CTGGGTGGCACCTCTGCTTGGCCCCAAGTGATGAGGCTCTGCTTACTCTGTCCACACTCAGTTTGAAGAGCCAGTAGTCTCCC
 TGACTGAGTGTAGCAGACTGACACAGGCAGTGGACCCAGCAGCAGCTGGACGCTGCTGACCTGGCATGTCTGCCATGGCCCCAA
 35 CACCGCTCAGGGGGAGGTGGATGCTGACTGCATGGATGTCAATGTTGAGGACAGGTAAGGCCACTGGAGACATGCACACAT
 TCCCTAGCATAGACTTAAGAGGCCAGTAGGACTTGAGGAGGGCTGGGTCACTGAAGGGCTCTGCCAGAGCAGCATCTGCCCTGAG
 CTGCTCGCTGCTCTCTCTGCCACACAGTATCTTTTTCATGAAATGTGCTTTTGAATAGTCAAAGTGTAAATTTTTTTTTT
 TTTTGTGCTCAGTTTTAGTATGCTGGGATTATAGTGTGTGCTTCCCATGCCAGCTAAAGTGTGACTTTTAAATTTATAGCAT
 40 ATAGGTGTATATAAAGATATCTTTTATTTATGTGATGTTCTGCCTACATATATGTCTGTGTAGTGTTAGATACCCAGTGCCT
 GTGGGGAGCCTGAAGAGGCCATTGGATCCCTGAAGCTGCACTTACAGATGGTAGTGAGCAGCTATATGGGTACTAGGGATTGAAC
 TCAGGTCTCTGGAAGAGAGCAGTGTCTTAACCACTGAGCCATCTCTGAGCCCTTATTTATGTTTAAAGCATTTTCTTCACT
 TTGAGTGTAAAGGGCACACATGTGCCATAGTACACAGTGGAGGTGAGAGGACTACTGTATGAGTGTGGGTCTCTCTCTTACC
 45 ATGTTGGTCCCAGAGTGCCTTCCAGGGAGGAGCAGTGCATCCCTGGGGACTTCACTCCGGGTCCCTTAACTGCAGGACTGCCTG
 CCAGGGCTATGGTTGAATGTTGACCTTCCCTGAGGCTGACACCATCTTCCACACTTACCCTTGTCTCTGACATG
 GCTTACACCCCTCATGATTGCTTCTGAGTGGAGGGGCTTGGAGCAGGCAACAGTGAAGAAGAAGATGCACCTGCTGTC
 ATCTCTGACTTCTATACAGGGCGCCAGCTTGCACAAACAGACAGACCGCACCGGGGAGACCGCTTGCATTTGGCTGCCGATA
 50 CTCTCGTTTCAAGTGTGCAAGCGCTTGTGAGGAGGAGTGCAGATGCCAATCCAGGACAACTCCAGGACAACTGAGTGTGACT
 CAGCAGTTTCTGCAGATGCTCAGGGTGTCTTCCAGGTACGACAGTGCATCTTGGAGCCAGTGCATCAGGTCTGACTGGC
 ATGGACCTGCAATCTCTAATCCAAGTGTGACTGGGAGGAACTTGGCACCTTCCACTGCATTTTGAAGGAAGTCCAGGTAC
 AAAGGGCATCAAGTCCCACTGTGTTCTCTGAGCAGGCTGGCTGAAGTGGTCTTGGGAACCTACAGGGTGAAGGAGGCGCTCCT
 55 TACTCTCAGTAAACCTCCCAATCTCAAGGCTATGGCTTGACTTGAAGTCTCCACTTCCAGTGTCTTGCAGACTAAC
 CTACCCCATTCAGCTGTGGTGCAGGCATAGCCATGGCGGCAGAAAGAGAGCTTTAGAGGCTGTGGTCTTGGCTGCAAGGCTA
 TCTCTGCTTGGCTTAGAAGCTTGGAGCCAGCTGGGTGGATTAAAGATTAGTCTGCTGGGTCTGAGGAGCAACCTTAGTA
 GTTCTCTGCTGATGTTGCCAGCCAGTACCCCTGCTACCAAGCTGCTCCTCAGGCGGCCCTGGAGCAAACTCCAATGGGGAATAG
 ACCAGGCATCAAAAAGCTTGTCTTAACTATTCTTAACTTGAACCACTTTGTGCTGTAGAGAAATTAACCAAGACAGG
 60 GCAATGTACACCTTTATCCAGCACTCTAGAATCTGAGAGGATTGTGAGCATGAGGCTAGCCTGGTCTTCATAGAAGACCTTAT
 TTCAAAATAGCAAGAGAGGTTGAGACAGCCACAGGTTATGTTGACTGCTGGTGTACAGCTCTCCACATGGCTGCTCTGCTT
 CATAGACAGATGTTGTACGTTTGTAGGAATCCAGGAGTGTGTGAATCTTACCAGGTACCAACCCACTCCCTCTCTCAC
 CTTAACAGTTCCAAGTACGGCTATGGGCCATGAGCGGGATTCTAGCTGGTACTCTCCCTCTCTCCCTCATGTATGAGTTT
 GATTTCTCAACTGGAGGTAGTTCTGGCAACCATACCAAAAGATGAGGTCCAGTATAGATCCCCACTTCCAGTGTCTCTGTTG
 65 AAGAGCCCGAGCTCTTGCACATGGAATGTAGCTTCTGCTTCTCAGGGGCTCAGTGAGCCAGTCCAGGCATTGGTTCTGGAG
 ATACAGGCTTGCATTTAGATCACCTGCTGAACCCATCCCTGCTTCCAGATCTGCTCCGGAACAGGGCCAGATCTGGATGC
 CCGAATGCATGAGGCAACTCCACTGATCCTGGTGCAGCGCTGGCCGTGGAGGCGATGCTGGAGGACCTCATCACTCATATG
 CTGACGTCAATGCGGTGATGACCTAGGTAGGCCAGCTACAGCCAGCTACCGAGGACATCAGCCAGTGCCTGCTGCTCAGC
 CCAACCCACTCTCTCTCTTCTTCTTCCAGGCAAGTGGCTTGTGATTGGGCGGCGCGGTGAACAAATGTGGATGCTGC
 70 GTTGTGCTCTTGAAGAACGGAGCCAACAGGACATGCAACAAAGGTAAAGCAGACGGGCTGCTTAAACCGAGGCGCATGATG
 GGGACTCCGGGGCACCATACTGTTGACCACTTGAAGGTTAAAGAGTGTCTGGGACAAAGCAGCTTAAACCTGCTTCTTGC
 TGGAGAGGAGCTGAGGCGTAAGCAGCTGTCCATGTACCGTTACTTGAAGCTTGCCTTCTGTCCCTTCTGTCTGCTGGTGTG
 GGTGACCTTAGGGGTTCAGGATTGGCCAAGGGGAGGATGGGGTGGCCCTGTCTTAAAGGCTGCAAGGCTTCTGGCTTGGTCC
 75 ACCACTACCATCTCCCTCTTGGGATAAGAAACTGTGAGCTGGGCTGCGTGTCTCCACTCGCTCCAGTGTCTCTGTTT
 TGCAGGGCTAGTTGCTTCTCAGGACTCTGCTTGTGCTCAGGGGAGAGTTTGTGCTTCTTACCAGCTCCACTGCAGGCTG
 GGAATGGAGCAGGAGTCAAGTCTGGAGTGTGTTGGGCAGAGTTTCCACAGTCCAGGGTGGGCGAGTGGTTATAGAGAAAT
 CCAAGCCTGATAGACATTCTGTTGTGGTGTGATTATGCTGTCGACAGAGCAGACTGGAAGGAGTGAAGTGCCTTAGCCAT
 TGGTGACCTTTGGCATGGTAGTACCTTCCCATGGCCATTCACTTGCCTTAAAGGCTCCTGAGTCCAGGATTGAGTACTTGTG
 CCGTCAATTTGGGGAGCAAGCAAGGCGCACAGTTTCACTTCTGTTTTCGGCAGTCTGACTCCACAGGGGAGAGGCCCTATG
 TATTTATCCACAGATCTCTGGGTGTGAGGTGTTAAATCTAGGTTCTCTAAAAAAGAACTCGGACACGCACTGTGTGCTGCT

AGCACCCGAGAAGCTGAGGCGAGGACGATAGTCTGAGTTCCTCAAGTACGGCTGTGGGCCCTGAGTGAGATTCCTAGCAACATAGGAAGGCC
CCACTATAAAATCTCTCTGAGCGCTGGTGCTCTGAGTACTGCTGGGTCTAGATAGTCTCTCCAGATAGGAAGAGGAAGGAGGAGCAG
ACTGCTTCCCTAGGCCCTCCCCGAGGCATCATCAATGACTCAGCAAAATCTACACTGCCGCTCCCTCATGTACTCTCC
TGTCCTGTCTACAGGAGGAGACTCCCTGTTCTGTGGCGCCCGTGAGGGCAGCTATGAGACTGCCAAAGTGTGTCTGGACCACT
5 TTGCCAACCGGGACATCAGCGATCATATGAGACCAATGCCCCGGGACATCGCAGGAGCGTATGCACACAGATATCGTGGCGGCTT
TTGGATGAGTACAACTGGTGCAGCAGCCCAAGCTGCACTGTCATGCTCCCTGGGTGGCACAACCACTCTGTCTCCCACTCTCTCT
GCCAATGGCTACTCGGGCAATCTCAAGTCTGCCACACAGGGCAAGAAGGCCCGCAAGCCAGCACCAGAGGGCTGGCTGTGGTA
GCAGGGAAGCTAAGGACTCAAGGCACGGAGGAAGAAGTCCAGGATGGCAGGGGTGCTCTGTTGACACGCTCGAGCATGCTGTGCG
10 CTTGTGGACTCCCTCGAGTCAACCCATGGCTACTGTGCAGATGTGGCTCGCCACCCTCTCTCCCTCCCTCCAGCATGCTCTCC
ATCCATGCTCTCAGCACCTGCTGGTATGCTGCACACTCACTTGGGATCAGCCACTTGAATGTGGCAGCAAGCTCGATGTGG
CAGCACTGGCTGGAGGTAGCCGGTGTGGCTTTGAGCCACCCCGCCAGCCTCTCCCACTGCTGTAGCTCTCAGTGTGCCAGCACA
GTGCTGAGTACCAATGGCAGCGGGGCTATGAATTTACCCGTGGGTGCACCGGCAAGCTTGAATGGCCAGTGTGAGTGGCTTCCCGG
GCTCCAGAAATGATGTGTGGCAGCGAGTACAACCACTACGGCCGGGTGTGACGCCGGGCACTGAGCAGCAGGCAGCTGGCG
15 TCCAGCATAGCATGATGGGGCCACTACACAGCAGCCTCTCCACCAATACCTTGTCTCCCGATTATTTACCAGGGCTGCCAACACA
CGGCTGGCAACACAGCCTCACTGGTGCAGACCGAGGTGCAGCAGCAGAACTTACAGCTCCAGCTCAGAACTCGAGAGCCACT
ATCACAGCCACACTCAGTGTGCTCGGACGCAATGGGCACTGGGCGGGAGCTTTTGTAGTGGGGAGCCAGTCAAGCAGCATG
TACAACCGCTGGGCCCCAGCAGTCTGCTGTGCACACCATTCTGCCCCAGGAAAGCCAGGCCCTGCCACATCACTGCCATCTCTCC
ATGGTCCCACCCATGACCACTACCCAGTCTCTGACCCCTCTCTCCAGCAGAGTTACTCTCTCCCTGTGGACAACACCCCGAG
CCACCAAGCTGCAGTGGCAGCAGCCCTCTCAACCCATCCCTGAGTCCCTGACCACTGGTTCAGCTCTCTCCCGCATCTCCA
20 ACATCTCTGATTGTGTGGAGGATCTCCAGCGCGCCACCACTGCGGTCCAGATACCCACATTTCCAGAGGCATTTAAATAA
ACAGAGATGTGGGATGCGAGGACCCAGCTCCGTTCCCAAGCCCTGTTGGGAGTCTTTCCAGTGTCTCAGGATGTGTGGGCGACC
AAAGGAGCCCTTTTAAAAAATGTTTTTATACAAAATAAGGAGCAAGAATTTCCATTTTTTTTTTTAGTATTTATTTATGTACTTT
TATTTTCCAGAAACACTGCTCTTTTATTTATGTATTGTTTTCTATGGCACTAGGGAAGAAACATATCTGTTCCAGAAAAATAA
ACTAGTCTCAGAGCCTGTGATTTTCTGGTCAGGGTGAAGTTCCTCTGTGTCTGTATTAATATGAACAAGGATCATGATTTGTAA
25 ATGCTGTTTTATTTATGATTGCTCTTTTCAAAATCGAAAAGAAAGAAAAGCAAGTGCAGACGAGGAAGGAGCTGGAAATGCC
ATGGCCAGAATGGCCCTCCCCACACTCACTGCCCTCCCCAGCGTCACTGGGATTTGAGATGTTTGAAGAACAGCCGCA
GACCTTGAACCTTGGGTTCATGGATTAGTTTTGTATCTAAAAACAGGAACAAGTCAGATGATGTGGTTGTACACTTTCTGTAAAC
ACCACTGTGCACTTGGAAGTGTCTCCAGATGTGTCAGAGTCTACTACCCAGTACAGTGTGAGTCTCGAGGCTCCAGTGTCT
GTAGTAGTGTATTAGGCTTTGGGAGTACTTCTCCCTGGCTGCCACTGTCTCCCTCTCGAACAACTTGAGCCAGTGAAGCATTG
30 CAGGGTGTGGTGCTCTCTAGAGAAAACTGCTGGACTGTTCTGTGCATCCTCCAAACAGCATCATCCAAATCCAAGTGGAGAC
AGACGGACTGTCCGGCTCGGGCTGGGCTCTTAACACTGACTGCCAAAGGGCTCCAATGTGCATTTGGACTCGCCAGAGTAGC
TGCTCATTTGAGACTCCAAGAAAACAGAAGCTATGTGGCTCTGATCCCCAACTGGCTGGGTGGGACATGCTTGTGAGTGTGCT
AATGTGGGTGGAGCTGCTCTGGGCGCACCCCTCTGGTTGAGGGCTGTGCTCAGCAGATTTCTGCGATATCAAGTATACGCCCT
GTGGCAGAAATAGATATCTGTAATACATGTTTAAAGATGGATTTTGTGTTAAAAAATCTAAAGGAACAAGTGTCTGTGTCAAGC
35 TGATGAGGACTGTGAGCTGTGGCTAGTCTCAGTGTGACCCAGCCTGTGACCTGTGAGCTGTGAGCTCGGAACAGTAGCTCTTAAGAGCA
CAACCAGGATGGCCATCTGCTGCCACCAAGTCTCTTCCAGCACTGTGTGCTCGGAGGCTTTCCGGGGCAGTGTGCCACCTCC
TCAGGGCAGCTCTTTCTGGCCTTTTGGGGGCGAGTGTCTGTGCCATCTCAATAGATATGACACGACGCTCCTAAGATGTGTGATT
CTTACTGTGTTGTATAAAATAAGTGTAGTTTACAAAAAAGAAACGTAAGAAAAAATAACATGACGCAAACTGTAGGTAAATGA
AAATGATGATTTTTTTTCTCTTTTTTGTAACTAATTTGCAATAAAATGATCATGAGTGTGTTCCACTTTTGTCAAACTTTG
40 AGTGTGGTTTGGTTCACTTTTTGGGAGTGTGACAGAGAAAGGGCCACCAGCACTGAAATAACCAATCCAACCCCTCTCTTACA
CAGAAATACAGAGGTGGCTTAAAGGACACCACTTTCAAGAGCTGCACAGCGAGGGCATCAAGTGTGGGAAGACAGCTTTCCAAA
GAGTTGATGAGTCTCTCGAGGATGTGGATCTGATTGATGCCAGCTGATTCTCTGTAGCAGCAGAGGATGAAGCACTTATG
TTGTCATAGATGACTATCTCTGAGCCAGTAACCCCCAACCTCTTCAAATTCAGCCATGCTTGCAAAAGGTCATCCAGCTGTG
CTTGTGACTGCTTATAGCACTCTCAAAGATCTGGGAAGGTCAAGGACTTAAGGACCCCTTGCTGATGTCCAGTCACTTTGT
45 TGTATGCACTCTGCCCTCAATTGTGCACTGACCTGAGGAGTACTAGTATAGTCTGGAAGACTATGAGAGACTCCATCT
ATGTGGCTGTGAGGAAGCCCTTATCCCTGTGGGTAAATGTTGTATTAATATTCAATTAATAAAGGCTGGGCTGTGGGCACAGC
CTTTAATCCTAGCACTCAGGAGGCGAGGCGAGGTGGATTATGAGTTGAGGCGAGCCTGGTCTACAGAGTGAATCCAGGACAGC
CAGGGCTATACAGAGAACCCTGTCTCGAAAACCCAAAAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
50 GCAGGTCACTATCCAATCAATGGTTTATGAAGACACACAACTTTCTTATTTTATATGCTCTTATTCAGCAACAATGAGTGG
GTAGCTGCTAGCTCCATATTGTAAAGACTGTCTGCCCTTCTGAATCTCTGCTACTAATTTCTATGTTCTCTGTGGCTGAT
CTAGACAAAGTTGGGCGACCTTATAGGCCAGTCTCTCCAGCTCTCTCAGGTGGTAGCTTGCTCTGCTGCACTCTCCCA
GGCATGGCATCTCTCTCTCCCAACTCTCTCTCTCCCACTCAAGTCTCAAGCCAGGAGTCTTAAGCGGTCCACTTGTCT
TGTCTCTCCAGCTACTGGCTATTGGTATCTTTATTTACCAATCAGAACCCTGCGGGACAGGTTCCCAAGCTATGTGTAGACC
TTCTCTGTGAGTTCGGGGGAACATTAAGATTTGTAATCAAAACAGCTACAAGTAAGAGTTCCAATGTGGACTGAGTAAGTAACCC
55 TTTACATCTTGTCTGCTCTTGTGACGGCTGCAAAATCAATTTGGTGCCCTAGCTCAGTCTTGGTGTCTAGGACCTTAGGAGGGGTTA
AGTGTGTCTCTCTCTGGGAAGGAATTTTAGCAACACTCATCTAGTCCGAGAGCCAGCAGGTACAAAGGCATCTTAGCCCTAAGA
AGAAATCAAGATAGCAGAGGTGTGATCTCCCTTGCCCTGTGTGCTGCTGATTTGTGTCAACTGACACAGCTGGAGTTATCA
CAAGAAAGAGGTTTCAGTTGGGGAATGCTCTGCGAGATCAGCTGTGAAGCATTTTCTCTAGTATCAAGGGGGAGGGGCC
TTTTTGGGTGGTACCATCTCTGGGCTGGTAGTCTTGGGTTCTATAAGAGAGCAAGCTGGAGCAAGCCAGGGGAACCAAGCCAGTAA
60 AGAACATCCCTCCATGGCCTGTGATCAGTCTCTGCTCCTGACCTGCTGTGAGTCCAGTCTGACTTCTCTGGTGTGAACAGCA
GTATGGAAGTGTAAAGCGAATAAACCTTCTCTCCCACTTGTGTTCTGTGATGTTGTGAGGATGAAGAACCTGACTACT
AGACACTGCTGCTAGGCTCTCAATTTGGCCACACTTGGGACAGCAGGAGTCTTAACCAAGGTGACAAATGGGGAATGTGATG
CCCTCTGTAGGCTGACATCTGAGGACAAGTGTGAATCCATCAAGTTCAAGTGTCTTGGCCCGGCTCAGTGTGACCACTGTGAAA
CGGAGCGGGGCCAGGGGCCAGAGAGGGTGTCTCAACACAGAAATGTGATAAATGTGCTCATTTCTGCCCTCAAGGGGAAGGTCG
65 GAGCTGAATTCCTCCGAGAGAACTAGCATCTCAAATTTCCATCCGGAATGGAATGTGCTCAGCTCGGAAGGGCTTAGCAGGCTCA
TATGCTGGGTGTTCTCTAGAGCATCATCCAAATGGCATGTGACGCCAGGGTTCACAACTGATGGCTGGACCCTGAGAACA
TCTGGACTGGGTTCGGGTGAAAAAATGATGTTTGCAGATCAAGACAGGGCTACCCATGTGGGCAATCTTCTCCAGTGAGA
GACCAACACAAAGGTTGAGGAAGAGGGATGATCTGCTCTGCGGCAAGACATGAATCTCTCTCCCTCAGGCTCCCAAG
GAAAGATTGCTGTTCTTGGGTCTCCAGCTTGCCAGGTACAGCTCTGGGGACTTGCACACCCCAACACCTCTCTTTGTATCTACCC
70 TAGTAACATTCAGTGGAGTATTTTTCAGCCATAGAAGGAACAAAGCTCTGAGACCTACTAATCATGTGGTGGAGTCTGAGGAGGA
ACAGAGGCTCGTGAAGACATCTCAAAATGACCATGATTTACTCTTATGAATGTCTCAGTAAGTAAAGCAACAAAGACAG
AGAACAGGTGGCCATCTCTGGGTGACGGAAATGGGTATGACTGACATGCTTATACATTTGACTTTGATGGATAGTCCAGCAG
TGTGTACGCTTAAGGCAGAAGGCTGCATGGCACTGTGAAGGCTCCAGACCCGCTCAATGTAGATAATCCCAATCTGAGTGTCTACT
AAAATACCAAAAAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
75 TTTATTTTGTGACAGGATCTCTGTGGGTATCCAGGTTGGCTCAATCTCACCATGCTCTGCTGCTCAATCTCCCAAGTGTGGGAT

324

5 CAGGCAAGATGTTAATGAGTGCAGGCAGAACCTGGGCTGTGCCCATGGAGGCCACTGCCAATGAGATCGGCTCTATCGCT
GTGCCCTGTGTGCCACCCATACTGGTCCCCACTGTGAATGCCCTATGTGCCCTGCAGGCCCTACCTGCCAGAAATGGAGCAACC
TGCCCTCTTACAGGGGACACACCCACGAGTGTGCTGCTTGGCAGGTTTGTGTTGACAGAACTGTGAAGAAATGTGGATGACTG
TCCAGGAACAACCTGCAAGAATGGGGTGCTGTGTGGACGGCGTGAATACCTACAATTGCCGCTGCCACCCGAGGTTGACGGGTC
10 AGTACTGTACAGAGGATGTGGACGAATGTCAAGTCTATGCCAAATGCCCTGCCAGAAATGCGGGAACCTGCCACAACACACGCGGGC
TACAACCTGTGTGTGTCAATGGGTGGACTGGCGAGGACTGCAGTGAGAACATGTATGACTGTGCCAGTGGCCGCTGTTCCAGGG
TGCCACTTGCCACGACCGTGTGGCTTCTTCTACTGCGAATGTCCGATGGGCGCACAGGTTGCTGTGCCACCTCAAGCATGCGT
GCATCAGCAACCCCTGCAACGAGGGCTCCAACCTGTGACACCAACCCCTGTCAACGGCAACGAATCTGCACCTGCCCTCGGGGTAC
ACAGGGCCAGCCTGCAGCCAGGACGTGGATGAGTGTGATCTGGGTGCCAACCCTGTGTAGCACGAGGCAAAATGCCCTCAACACACT
15 AACTGTGACATCAACAACAGAGTGTGAGTCCAAACCCTGTGTCAACGGTGGCACCTGCAAGGACATGACCACTGGCTACGTATG
CTTCAACGGGCACTGTGCCAGTATGATGTGGATGAGTGTGCCAGCACACCATGCAAGAACGGTGGCAAGTGGCTGGATGGGCCCCA
ACAGGATGAGTGGCCAGCAGCCCTGTCTGCACAATGGCCACTGCATGGACAAGATCCATGAGTTCATATGTCAGTGGCCCCAAGG
CTTCAACGGGCACTGTGCCAGTATGATGTGGATGAGTGTGCCAGCACACCATGCAAGAACGGTGGCAAGTGGCTGGATGGGCCCCA
ACACTGATCACTCGCTGTGTACAGAAGTTACACAGGACCACTGCCAAGTGGACATTGACGAGTGTGACCTGACCCCTGACCCCTGCCAC
15 TCTGTTTCTGTGAAGGATGGTGTGGCCACCTTTACTGCTGTGCCAGCCAGGCTACACAGGCAACATCACTGTGAGACCAACATCAA
TGAGTGGCCACAGCAACCGTGGCCCATGGGGGACCTGCCAGGACCGTGACAACTCTACCTCTGCTTATGCTCTCAAGGGAACCA
CAGGGCCCACTGTGAGATCAACTGGATGACTGCGCCAGCAACCCCTGTGACTCTGGCACCTGTCTGGACAAGATGTATGGCTAC
GAATGTGCTGTGAACAGGCTACACAGGAAGCATGTGTAACTGCAACATTGACGAATGTGCGGGGACGCCCTGCCACAACCGGGG
CACTGTGTAGGATGGCATCGCGGCTTCACTTGCCGCTGCCCGAGGGCTACCATGACCCACGCTGCTGTCCGAGGTCAACGAGT
20 GCAACAGTAACCCCTGCATCCACGGAGCTTGCCGGGATGGCTCAATGGGTACAAGTGTGACTGTGCCCTGGGTGGAGTGGAAACA
AACTGTGACATCAACAACAGAGTGTGAGTCCAAACCCTGTGTCAACGGTGGCACCTGCAAGGACATGACCACTGGCTACGTATG
CACCTGCCGAGAAAGGCTTCAGTGGCCCTAATTGCCAGACCAACATCAACGAATGTGCTTCAACCCCTGCTGAAACAGGGGACCT
GCATGTGATGTGCTGCTGGATACAAGTGAACCTGTCTTGCATATACAGGAGCCAGCTGTGAGGTGGTGTGGCCCCATGTGCT
ACCAACCCCTGCAAAAACAGCGCGCTATGCAAGGAGTCTGAAGACTAGAGAGTTTCTCTGTGTCTGTGCCACAGGCTGGCAAGG
25 TCAACCTGCGAGGTTGACATCAATGAGTGTGTGAAAGCCCATGTGCCATGGGGCTCTGCCAGAACCAATGGCAGCTACC
GCTGCTCTGCGAGGCGGGCTATACAGGTGCAACTGTGAGAGTGATCATGACTGCGGCCCAACCCGCTGCACAAATGGGGGT
TCTGTGAGGATGGCATCAACACAGCCTTCTGCGACTGCTGCCGCTTCCAGGGTGGCTTCTGTGAGGAGGATCAATGAATG
TGCCAGCAATCCCTGCCAAAATGGAGCAATGCACTGACTGTGTGGACAGCTACACATGTACCTGCCCGTGGGCTTCAATGGCA
TCCACTGCGAGAACACACACCTGACTGTACTGAGAGTCTCTGCTTCAATGGTGGTACCTGTGTGGATGGTATCAACTCCTTCAAC
30 TGTCTGTGTCACCTGGCTTCAAGGAGTACTGTGATGATGTCAATGAGTGTGATTACGCGCCCTGTCTGCACGGTGGTAC
CTGCAAGGAGCATATGGTACTTATAAGTGTACTGCTGCCACAGGGCTACACTGGTCTCAACTGCCAGAACCTGTGCGCTGGTGGC
ACTCGGCTCCCTGCAAGAAATGGTGGCAGGTGCTGGCAGACCAACACGAGTACCACTGTGAGTGGCGCAGCGGTGGACTGGCGTC
AAGTGGACGCTGCTCAGTGTCTCTGTGAGTGGCTGCACAGAAGCGAGGCTTACGCTCACTCTCTGTGCCAGCATGGAGGGCT
35 CTGTGTGGATGAGGGAGATAAACATTACTGCCACTGGCAGGAGGCTACACGGGACGCTACTGTGAGGACAGGTGGAGTGGCT
CACTTAACCCCTGCCAGAAATGGAGCTACCTGCATGACTATCTCGCGGCTTTCTCTGCAAGTGTGTGGCTGGCTACCATGGGTCT
AACTGCTCCGAGGAGATCAACGAGTGGCTGTGCCAGCCCTGCCAGAAATGGGGGTACCTGCATTGATCTGACCACTCTCAAGT
TCTCTGCCCCGGGGACACAGGGGTGACACTGTGAGATCAATGTTGATGACTGCCATCCCCCTTGACCTGCCCGAGGCC
CCAAGTGTCTTCAACAATGGCACTGTGTGGACAGGTGGGTGGCTATACCTGCACCTGCCACACAGGCTTCGTGGGGAGCGGTGT
GAGGGTGTATGTAATGAATGTCTTCAACCCCTGTGACCCACGTTGGCAGCCAGAACTGTGTGAGCGTGTATATGACTTCCACTG
40 CGATGCGCGGCTGGCCACACTGGACCGCTGTGAGTCACTCAATGGCTGCAAGGGAACCTTGAAGAAATGGGGGTGTCT
GTGCGGTGGCTTCAACACCGCCGCTGGATTATCTGTAGGTGCCCTGCGGGCTTCGAGGGTGGCCATGTGAGAATGATGCCCGC
ACTTGTGGCAGCTTACGCTGTCTCAACGGTGGTATGATCATCTCGGGCCACGTAAGTCCCACTGCTATGCTGGGATCTCTTAC
CGGCTGAGTGGCAGTTCAGGCTGCCAGCCGCTGTGTGGGTGAGCAACCTTGTGAGGCTGCTGAGCCCACTCGGACCCACCG
45 AGAACCTTTCTACCGCTGTCTATGCCCTGCCAAATTAACGGGCTACTGTGCCACATCTGGACTACAGCTTACAGGTGGCGCT
GGCCCGGACATTCACCGCATGTGGCTGGATGGTGGCTGAGCTGCTGAGTGGCAGGTGGATGAGGCAATAAGGTCTGCAACCT
GCAGTGTAAATACACGATGTGGCTGGATGGTGGCTGAGCTGCTTCACTTCAATGACCCCTGGAAGAATGACGACGAGTCTC
TACAGTGTGGAAGTATTTAGCGACGGCACTGTGACAGCGAGTGAACCTCGGCGGCTGCTCTTTGATGGCTTCGAGTGGCAG
CTCACCGAGGGGACAGTGAACCCCTGTATGACCACTGCAAGGACCACTTCAATGATGGCCACTGCGACAGGGCTGTAAACAG
50 TGCCGAATGTGAGTGGGATGGCTAGACTGTGCTGAGCATGTACCCGAGCGGCTGGCAGCGGGCACCCCTGGTCTGGTGGTGTCTG
TCCACCCGACAGCTACGGAACTCACTTCCACTTTTCTGCGGAGCTCAGCCACGTCGTCTGCACACCAACAGTGGTCTTCAAGCGT
GATGCGCAAGGGCAGCAGATGATCTTCCGTAATATGACCAGTACTGCAAGGACCACTTCAATGATGGCCACTGCGACAGGGCTGTAAACAG
TTGGGCCACCTCTTCACTGCTTCTGGTACAGTGGTGGGCGCCAGCGCAGGAGCTGGACCCATGGACATCCGTGGCTCCATTG
55 TCTACTGTGAGTGCACAACCGCAATGTGTGAGTCACTCTCGAGTGTCTTCCAGAGTGGCACCGGATGGCTGCTTCTAGGT
GCTCTTGGCTCACTTGGCAGCCTCAATATCTTACAAGATTGAGGCGGTGAAGAGTGAAGCGGTGGAGCTTCCGCTGCCCTCGCA
GCTGCACCTCATGTACGTGGCAGCGCGGCTTCTGTGCTCTGTTCTTGTGGGTGTGGGGTGTGCTGTCTCCGCAAGCGCGCGG
GCCAGCATGGCCAGCTCTGGTTCCCTGAGGGTTTCAAAGTGTGAGAGGCCAGCAAGAAGAAGCGGAGAGAGCCCTCGCGAGGAC
60 TCAGTGGCCTCAAGCCCTGAAGAATGCTCAGATGGTGTCTGATGGACGACAATCAGAACGAGTGGGGAGAGCAAGACCTGGA
GACCAAGAAGTTCCGGTTTGGAGAGCCAGTATGTTCTCCCTGACCTGAGTGTGATGAGTGAACAGGCAAGTGGACCCAGCAGCACC
TGGAGCTGCTGACCTGCGCATGTCTGCCATGGCCCCCAACCGGCTCAGGGGAGGTGGATGTGACTGATGGATGATCAATGTT
CGAGGACAGATGGCTTCAACCCCTCATGATTGCCCTCTGCACTGGAGGGGCTTGGAGACAGGCAACAGTGAAGAAGAAGAAGA
75 TGCACTGTCTCATCTCTGACTTCACTACAGGGGCGGAGCTTGCACAACAGACAGACCGCACCGGGGAGACCGCTTGCAT
TGGCTGCGGATCTCTGTTCACTGCTCGAAGCGCTTGGAGGCCAGTGCAGATGCCAATCCAGGACAACATGGGCGGTACT
CGTTTACATGACAGTCTTCTGAGATGCTCAGGCTGTCTTCCAGATCTGCTCCGGAACAGGGGCCAGATCTGGATGCCGAAT
GCATGATGGCACAACCTCACTGATCTGGCTGCGCGCTGCGCGTGGAGGGCATGTGAGGAGCTCATCACTCAGATGCTGACG
65 TCAATGCGGTGGATGACCTAGGCAAGTGGCTTTGATTGGGCGGCGCGGTGAACAATGTGGATGCTGCTGTTGTGCTCTGAA
AACGAGGCCAACAAGGACATCGAGAACAACAAGGAGGAGCTTCCCTGTTCTGTGATCCGCGTGGAGGCTGAGACTGCCAA
AGTGTGTGAGGACCACTTGGCAACCGGGACATCAGGATCAATGGACGATTGCCCGGGACATCGCACAGGAGCTATGACACC
ACGATATCGTGGGCTTTGGATGAGTACAACCTGGTGGCTCCCCACAGCTGCATGGCACTGCCCTGGGTGGCACACCCACTCTG
TCTCCCACTCTGCTGCCAAATGGCTCACTGGCAATCTCAAGTCTGCCACAAGGGCAAGAAGCCGCAAGCCAGGACCA
70 AGGGCTGGCTTGTGGTAGCAAGGAGCTAAGGACCTCAAGGACAGGAGGAGAGTTCAGGATGGCAAGGGCTGGCTGTGGACA
GCTCGTGGAGCATGCTGTGCGCTGTGAGTCCCTCGAGTCAACCCAGTGTGCTGATGTGGCTCGCACCCCTCTCTCTCT
TCCCATCTCCAGCAGTCTCCATCTGCTCTGAGGCTTGGGATGCTGACACCCACTGGGCTGAGTGTGAGTGTGAGTGT
GGCAGCCAGCCTGAGATGGCAGCACTGGCTGGAGGTAGCGGTTGGCTTTGAGCACCCCGGCCACGCTCTCCCACTGCTG
75 TAGCTTCAAGTCTGTCACAGTGTGAGTACCAATGGCAACGGGGCTATGAATTTACCGTGGGTGACCGGCAAGCTTGAATGGC
CAGTGTGAGTGGCTTCCCGGCTCCAGAATGGCATGGTGTGCCAGCAGTACAACCCACTACCGCGGGGTGTGACGCGGGCACACT

5 GAGCACACAGGCAGCTGGGCTCCAGCATAGCATGATGGGGCCACTACACAGCAGCCTCTCCACCAATACCTTGTCCCGGATTATTT
ACCAAGGCGCTGCCAACACAGCGCTGGCAACACAGCCTCACTTGCTGTCAGACCCAGCAGGTGCAGCCACAGAACTTACCACTCCAG
CCACAGAACTTACAGCCACCATCACAGGCCACACCTCAGTGTAGCTCGGCAGCAATGGGCACCTGGGGCGGAGCTTCTTGAGTGG
GGAGCCCACTGACGCCAGATGTACAACCGCTGGGGCCCAAGCAGTGTGCTGTGTCACCACTTCTGCGCCAGGAAAGCCAGGCCCTAC
CAACATCACTGCCATCCTCCATGGTCCACCCATGACCACTACCCAGTTCCTGACCCCTCCATCACAGCACAGTTACTCCTCCTCC
CCTGTGGACACACCCCGACCCAGCTGTCAGGTGCCAGAGCCCACTTCTCACCCCATCCCTTGAGTCCCCTGACCAAGGTGC
CAGCTCCAGCCCGCATCCAACATCTCTGATTGGTCCGAGGGCATCTCAGCCCGCCGACCAACATGCGGTCCGATCACCCACA
TTCCAGGGCATTTAAATAAACAGAGATGTGGGATGCAGGACCCAGCTTCCGTTCCCAAGCCCTGTTGGCACTCTTTCCAGTGC
TTCAAGATGCTGGGGCGACAAAGGAGCTTTTAAAAAATGTTTTATACAAATAAGAGAGCAAGAATTTCATTTTTTTTTTTAG
10 TATTTATTTATGTACTTTTATTTCCACAGAACCACTGCTTTTTATGATATGTATGTTTCTAGTGGCACTAGGGGAAAAACAT
ATCTGTTCCAGGAAATAAACTAGTTCCTAGAGCCTGATTTTCTGTTCAGGTGAGGTTGAAGTTCCCTGTGTGCTGTAATAATATGAAC
AAGGATTCATGATTTGTAAATGCTGTTATTTATTGATTGCTTCTTTCCAAATCGAAAAA

MOUSE SEQUENCE - CODING

15 ATGCCACGGCTCCTGACGCCCTTCTCTGCCTAACGCTGTGTCGCCGCGCGCGCCGCAAGAGGCTTGAGATGCTCCAGCCAAGTGG
GACCTGCCCTGAATGGAGGTAGGTGCGGAAGTGGCCAGCGGCATCGAAGCTGTGTTGCCACGGCGAGCTTTGTTGGGCCAACAGATGCC
AGGACCCCAATCCTTGCTCAGCACAAGTGTGAAGATGCTGGAACGTGTATGTTGTGGACCATGTGGGCATGTGGCACTATGCC
TGCAGCTGTCCCTGGGTTTCTCTGGGCCCTCTGCTGACACCTCTGGACAAGCCCTGCTTGGCCAAACCCTGCGCAATGGGGG
CACTGTGACCTGCTCACTCTCACAGATGACAAGTGGCGCTGCTCTCAGGGTGTGTCAGGAAATCATGTGACAGGCTGACCCCT
20 GTGCTCAACCCCTGTGCGCAATGGTGGCCAGTGGCTGCCCTTTGAGTCTTCATACATGTGCTGCTGCGCGCTGGCTTCCATGGC
CCCACCTGCAGGCAAGATGTTAATGAGTGCAGCCAGAACCCTGGGCTGTGCCGCCATGGAGGCCACTGCCAATGAGATCGGCTC
CTATCGCTGTGCTGCTGTGCCACCCATCTGTTCCCACTGTGAACTGCCCTATGTGCCCTGCAGGCCCTCACCTCGCGCAATG
GAGCAACCTCGCTCCTACAGGGGACACCCACAGTGTGCTCTGCTTCCAGGTTTGTCTGGACAGAAGTGTGAAGAAATGTG
GATGACTGTCCAGGAAACAACCTGCAAGATGGGGGTGCTGTGTGGACGGCGTGAATACCTACAATGTCGCTGCCGCCAGGAGGT
25 GACGGGTGAGTATGTGACAGGAGATGTGGACGAATGTGAGCTCATGCCAAATGCTGCGCAAGATGCGGGAACCTGCCACAACACA
ACCGCGGCTACAACCTGTGTGTGTCAATGGGTGACTGGCGAGGAGTGCAGTGAAGAACATGTGATGACTGTGCCAGTGGCGCTGT
TTCAGGGGTGCCATTTGCCACGACCGTGTGGCTTCTTCTACTGCGAATGTCCGATGGGCGCACAGCTGTGCTGTGCCACTCAA
GCATGCGTGCATCAGCAACCCCTGCAACGAGGGGCTCCAACGTGTGACACCAACCCCTGTCAACGGCAAGCAATGTGCACCTGCCCT
CGGGGTACACAGGGCGAGCTGCAGCCAGGACGTGGATGAGTGTGATCTGGGTGCCAACCGTTGTGAGCACGCGAGGCAATGCGCT
30 AACACCTGGGTTCTTTGAGTGGCGAGTGTCTACAGGCTACAGGGACCCGGCTGTGAGATGTAAATGAGTGCATGTCCAA
CCCATGTGCAATGAGCCCACTTGCCTGGACAGATTGGGGAGTTCGAATGCATATGTATGCCAGGTTATGAAGTGTATACCTGTG
AAATCAACAGCGTATGAGTGCAGGACGCCCCCTGTGCACAATGGCCACTGTGACGAGAAGTTCATGAGTTCCAATGTGCTAGTGC
CCCAAGGCTCAACGGGGACCTGTGCGAGTATGATGGATGTGGTGTGCGCAGCACCACTGCAAGAACCGTGCCAAGTGCCTGGA
TGGGCCCAACACCTATACCTGCGTGTGTACAGAAGGTTACACAGGGACCCACTGCGAAGTGGACATTGACGAGTGTGACCTTGACC
35 CTTGCCATCTGGTTCTGTGAAGGATGGTGTGGCCACCTTACCTGCTGTCGCGACGAGCTACACAGGCATCACTGTGAGACC
AACATCAATGAGTGCACAGCCACCGCTGCGCATGGGGACCTGCCAGGACCGTGCACATCTCTCACTTCTGCTTATGCTCTCAA
GGGAACACAGGGGCCAACTGTGAGATCAACCTGGATGACTGCGCCAGCAACCCCTGTGACTCTGGCACCTGTCTGGACAAGATTG
ATGGCTACGAATGTGCTGTGAACAGGCTACACGAAGCATGTGTAACGTCAACATGACGAATGTGCGGGGACGCCCCGCCAC
40 ACGGGGGCACTTGTGAGTGGATGAGCTCGGGCTTCACTTCCGCTGCGCCGAGGGCTACCATGACCCACGTCGCTGTCCGAGGT
CAACGAGTGCACAGTAAACCCCTGCATCCAGGAGCTTGGCGGATGGCTTCAATGGGTACAAGTGTGACTGTGCCCTGGGTGGA
GTGGAACAACTGTGACATCAACAACAGAGTGTGAGTCCAACCCCTGTGTCAACGGTGGCAGCTGCAAGGACATGACAGTGGC
TAGTATGCACCTGCGAGAAGGCTTCASTGGCCCTAATTGCCAGCAATCAACGAATGTGCTTCAACCCCTGCAAGTCAACCA
GGGACCTCTTATGATGTGCTGTGATACAGTGCACCTGTCTGCCATATACAGAGGCAGCTGTGAGGTGGTGTGGGCC
CATGTGCTACAGCCCTGCAAAACAGCGCGCTATGCAAGGAGTCTGAAGACTATGAGAGTTTCTCTGTGTCTGTCCACAGGG
45 TGGCAAGGTCAAACTGCGAGGTGACATCAATGAGTGTGAAAGCCCATGTGCCATGGGGCCCTCTGCGAGAACAACCAATGG
CAGCTACCGTGCTCTGCGAGCGGCTATACAGGTGCAACTGTGAGAGTGACATGATGATGCGGCCCAACCCGTGTCA
ATGGGGTTCCTGCAACCGATGGATCAACACAGCCTTCTGCGACTGCTGCGCGGCTTCCAGGTGCTCTGTGAGGAGGACATC
AATGAATGTGCCAGCAATCCCTGCGCAAAATGGAGCCAACTGCAGTGCATGTGTGGACAGCTACACATGTACTGCCCCGTGGGCT
CAATGGCATCTCATCGGAGAACCAACACATGAGCTGATGAGAGCTCTGCTTCAATGTGGTACCTGTGTGAGATGGTATCAACT
50 CTTACCTGTCTGTGTCCACCTGGCTTACGGGCGAGTACTGTGAGTATGATGTCAATGAGTGTGATTACGCGCCCTGTCTGCAC
GGTGTGCTACCTGCGAAGACGATATGGTACTTATGAAGTGTACTGCGCCACAGGGCTACAGTGTCTCAACTGCGGAACACTTGTGGC
CTGTGTGCACTCGGCTCCTTGCAGAAGATGGTGGCAGGTGTGGACCAACACGAGTCACTGAGTGTGAGTGTGCGAGCGGCTGCA
CTGGCGTCAACTGCGACGTGCTCAGTGTGCTGTGAGGTGGCTGCACAGAAGCGAGGCATTGACGTCACTCTCTGTGCCAGCAT
GGAGGGCTCTGTGTGATGAGGAGATAAACATTAAGTGCATGCGCACTGCGAGGACGCTACACGGGACAGTGTGTGAGGACGAGTGA
55 CAGTGTCTCACTACCAACCCCTGCGAAGTGGAGCTTACGCTGACTGATCTGCGCGGCTTTCTGCAAGTGTGTGGTGTGGCTACC
ATGGGTCTAACTGCTCCGAGGAGATCAACGAGTGCCTGTCCAGGCTTGCAGAAATGGGGGTACCTGCATGTGATCTGACCAACTC
TACAAGTGTCTCTGCCCGGGGGACACAGGGTGTACATGTGAGATGAGTGTGATGATGCTGCCATCCCCCTGTGACCTTGCCTC
CCGAAGCCCAAGTGCTTCAACAATGGCAGCTGTGTGGACAGGTGGTGAATTAACCTGCACCTGCCACCCAGGCTTGTGTCGGG
AGCGGTGTGAGGGTATGCAATGAATGTCTCTCAACCCCTGTGACCCAGTGGCAGCCAGAACTGTGTGACGCGTGTAAATGAC
60 TTCCATGTCGAGTGTGCGGCTGTGCCACATGGAAGCGCGCTGTGATGTCAGTCAATGTGCTGACGGGCAAACTTGAAGAATG
GGGTGTCTGTGCGGTGGCTTCAACACCGCCCGTGGATTCTATGTGAGTGTGCTGCGGCTTCCAGGTGTGAGTGTGAGAAATG
ATGCCGCACTGTGTGACGCTTACGCTGTCTAACGGTGTGATGATCTGCGGCGCAGTGTGCCCTCCACTGCTATGCTGTGGGA
TCTTCAACCGGCTTGAAGTGCAGTTCAGGCGAGCGCCCTGTGTGGGTGACAAACCTGTGATCACTGAGGACAGGCTGTGAGCC
CACATCCGAGAAACCTTCTACCGCTGTCTATGCTGCCAAATCAACGGGCTACTGTGCCACATCTGGACTACAGCTTCAACG
65 GTGGCGTGTGGCCGGACATTTCCCCACCGCAGATTGAGGAGCGCTGTGAGTGTGCTGAGTGTGCGAGGTGGATGTGAGGCAATAAGGT
TGCAACCTGCAGTGTAAATACACGATGTGGCTGGATGGTGGGACTGCTCCTCACTTCAATGACCCCTGGAAGAACTGCAC
CGAGTGTCTACAGTGTGGAAGATTGTTAGCGAGCCGCACTGTGACAGCAGTGCACACTGCGGCGGCTGCTCTTTGATGGCTTCG
ACTGCGAGCTACCGAGGACAGTGTGAACCCCTGTATGACCAAGTATGCAAGGACCACTCAGTGTGTGGCTTGTGACACAGGCG
TGTAACAGTGCAGATGTGAGTGGATGGCTAGACTGTGCTGAGCATGTACCCGAGCGGCTGGCAGCGGCGACCCCTGGTCTGGT
70 GGTGTGCTTCAACCCGACAGCTACAGGAAACACTCTTCCATCTTCTGCGGGGCTCAGGCACTGCTGCACCAACAGTGGTCT
TCAAGCGTGTGTCGCAAGGCCAGCAGATGATCTCCGCTACTATGGCCAGGAGAAGCTGCGCAAGCAACCAATCAAGCGCTCT
ACAGTGGGTGTGGGCACTTCACTGCTTCTGGTACAGTGTGTGGGCGCCAGCGCAGGAGTGTGACCCATGGACATCGTGG
CTCCATGTGTCTACCTGGAGATGCAACACCGGCAATGTGTGAGTCACTCTGCGAGTGTCTTCCAGAGTGCACCAAGTGTGGTCTG
TCTAGGTGTCTTTCGGTCACTTGGCAGCTCAATATCTTACAAGATGAGGCGCGTGAAGAGTGAACCGGTGGAGCTGCGCTC
75 CCCTCGACAGCTGCACCTCATGTACGTGGCAGCGCGCCCTTCTGCTCTCTGTTCTTTGTGGGTGTGGGGTGTGCTGTCCGCAA

GCGCCGGCGCCAGCATGGCCAGCTCTGGTTCCCTGAGGGTTTCAAAGTGTGAGAGGCCAGCAAGAAGAAGCGGAGAGAGCCCTCG
 GCGAGGACTCAGTGGGCTCAAGCCCTGAAGAAATGCTCAGATGGTCTGATGGACGCAATCAGAACGAGTGGGAGAGCGAA
 GACCTGGAGACCAAGAAGTTCGGGTTTGAAGGAGCCAGTAGTTCTCCCTGACCTGAGTGATCAGACTGACCACAGGAGTGGACCCA
 GCAGCAGCTGGACGCTGCTGACCTGCGCATGTCTGCCATGGCCCCAACACCGCCTCAGGGGGAGGTGGATGCTGACTGCATGGATG
 5 TCAATGTTGAGGAGCCAGATGGCTTCAACCCCTCATGATTGGCTCTCTGAGTGGAGGGGGCTTGAGACAGCAAGCTGAAGAA
 GAAGAAGATGCACCTGCTGTCTCTGACTTCTATCTACAGGGCGCCAGCTTGCAACACAGACAGACCGCACCGGGGAGACCGC
 CTTGCACTTGGCTGCCGATACTCTCGTTTCAGATCGTCGAAAGCGCCTTGAGGGCAGTGAGATGCCAACATCCAGGACAACATGG
 GCCGTACTCGGTATCATGCAGCAGTTTCTGCAGATGCTCAGGTGTCTTCCAGATCCTGCTCCGGAACAGGGGCCACAGATCTGGAT
 GCCGAATGCATGATGGCACAACCTCACTGATCTGGCTGCGCGCTGGCCGTGGAGGGCATGCTGGAGGACCTCATCAACTCACA
 10 TGCTGACGCTCAATGCCGTGGATGACCTAGGCAAGTCGGCTTTCGATTGGGCGGCGCGGTGAACATGTGGATGCTGCTGTTGTC
 TCCCTGAAGAACGGAGCCAAACAGGACATCGAACAACAAGGAGGAGACTTCCCTGTTCTGTCTGATCCGCGTGAGAGTATGAG
 ACTGCCAAAGTGTGCTGGACCACTTTGCCAACCGGGACATCAGGATCAGATGGACCGATTGCCGCGGGACATCGCACAGGAGCG
 TATGCACCACGATATCGTGGCGCTTTTGGATGAGTACAACCTGGTGGCGTCCCAACAGCTGCATGGCACTGCCCTGGTGGCACAC
 CCACTCTGTCTCCCACTCTGCTCGCAAAATGGCTACCTGGCAATCTCAAGTCTGCCACACAGGGCAAGAAGCGCCGCAAGCCA
 15 AGCACAAAGGGCTGGCTTGTGGTAGCAAGGAAGCTCAAGGCACGGAGGAAGAGTTCAGGATGGCAAGGGCTGGCT
 GTTGGACAGCTCGTCGAGCATGCTGTGCGCTGTGGACTCCCTCGAGTCAACCCATGGCTACTTGTGAGATGTGGCTCGCACCCCG
 TCCTCCCTCCCACTTCCAGCAGTCTCATCCATGCTCTCAGCCACTGCTGGTATGCTGACACCCACTGCTGGGCATCAGCCAC
 TTGAATGGCCAGTGTGAGTGGCTTCCCGGCTCCGAATGGCATGGTGGCCAGCCAGTACAACCCACTACGGCCGGGTGTGACGCG
 20 GGCACACTGTGACACACAGGAGCTGGGCTCCAGCATAGCATGATGGGGCCACTACACAGCAGCTCTCCACCAATACCTTGTCCCG
 GATTATTACCAGGGCTGCCAACACACGGCTGGCAACACAGCCTCACCTGGTGACAGCCAGCAGGTGCAGCCACAGAACTTAC
 CACTCCAGCCACAGAACTTACAGCCACCATCAGAGCCACACCTCAGTGTGAGCTCGGCAGCAATGGGCACCTGGGGCGGAGCTTC
 TTGAGTGGGGAGCCAGTCAAGCAGATGTACAACCGCTGGGCCAGCAGTCTGCTGTGCAACCACTTCTGCCCGAGGAAGCCA
 25 GGCCCTACCAACATCACTGCCATCTCCATGGTCCACCCATGACCACTACCCAGTTCCTGACCCCTCATCAGCAGCAGTTACT
 CCTCTCCCTGTGGACAACACCCAGCCAGCTGACAGGTGCCAGAGCCACTTCTCTACCCCATCCCTGAGTCCCTGAC
 CAGTGGTCCAGCTCTCCCGCATTCACCATCTCTGATTGGTCCGAGGGCATCTCCAGCCCGCCACCACTGCGCTCCAGAT
 CACCCACATTCCAGAGGCATTAAATAA

30 HUMAN SEQUENCE - GENOMIC
 CAGGCCAGGGAGATAATGGGGACAGGGAAGATAACGCAGTCCCCACGGCTATAAACAGGAAGCTCGGCCATGGGCTTGTGCGAGAA
 AAAGGCCCTCGGCTGTGCACGTGGTTCCTACATAGCCTTTGCCAGACACCTGCGTGGCCCTGGAGGTCTCCAGGCCGTGCCCGGT
 GCCCGACACGAGGATGTGCTGGGGGCTGGGCTGTCCCTCCATCGCAGCCCTTGTGTTGGCTCCCGTGTATGGGCGTGTG
 35 CTGCTGTGACACGAGGCCAGGATTAGTTTACGGCTCGGTCTCAGGCCAGGGCTTCTCTGCTACCCAGAGATGAGGGGCT
 TGGCTCGGGGTGGGCCAGGTCCCTGCAGTGTGCTGGAGCCACCCGACTGAGGCCGCTCTCTGCTGTCAGTCTTGTCTCTGG
 GCACGCTGGTGGGTGAGGCTAGGCTGTGCCCCGCTGCCAACCGGAATGAGGGGTGGCTTCTGAGCGTGACATTTGTGTCAGT
 TGTCTCAGCGTCCCCCATCTGTGCTCCACTCTCTCTGGGTGAGGTCTGGCACAGCCGGAGCGCTCAGGGGTCTCGGTGCA
 CATTGCTCTCCGGCGGACAGCAGAGCGCACTCTGATGGCGGAAGACCAGCAGGCCGTGGCCGATTGGGAGATCCCTCTGGG
 40 TAGGCTCCCGGGTCACTGTGTCTCTTCCCGCAGGTGCCAGTGTGAGGTGGTGTGGCCCCGTGTGCCCCAGCCCTGTCGAC
 AAACGGCGGGGAGTGCAGGCAATCCGAGGACTAGAGACTTCTCTGTGTCTGCCCCAGGGCTGGCAGGTGAGGCTGGCCAGG
 GCCCGGTGAGGGCTGGGATGGGAGGTGAGTGTCTGCGGACACAGGAGCTCCAGGAGGCTAGATGAGTCTTTGAAGAGGAG
 CCGGTGGGTGCTGAGGAGGCCCTGGTGGGAGAGTTCTGGAATCAGGAATGACCTGGGAGCAGCGTTCACCACTCCAGTTCCTGT
 GACCTTCTTAGGCCAAAATTAGGGAGAGGGGATGGTCTGGGGTCAAGGAAGCCACTCTGGGTGGGAGAGGCACTGTAGGTG
 45 GGTGGGCCAGCTTGGGAAGGGCTGGAGGGCCAGGGGCGCTGGTGACCAACCGGCTCTCTGCTGCCCCAGGGCAGACCTGTGA
 GGTGACATCAACGAGTGTGCTCTGAGCCGCTGCGGCAGCGGCATCTGCCAGAACCCACGGCGGTACCGCTGCCACTGCC
 AGGCGCGCTACAGTGGGCGCACTGCGAGACCGACATCGACACTGCGGGCCAGTGAGTAGCCCCGGCTCTGGCTCTCCAC
 GAGCTCTCAGGCCTCAGTTCCTCCGGCGAGGGTGGTGGCATGGTGTGGCCATAAGCACCCAGGAGGCCGAGTGTGGCCGG
 50 GGAGGGTGGGTGAGGTGTGGGGATGTGCTGAGGGATGGCCAGGGTGGTTCAGGAGGGCCCCAGAGCCGGCTGTCTCTCTG
 ACTTCCGGAAGAGTCAAGAGAGCCCTCCACGGCTCTTCACTGAGCCGAGGATGGCTCGGGCCGGCTGCACTCCCGCTGGC
 TCATCGGGCCCGCTGACGGCCAGGGCTCTCAGGCCTCCAGCCCTGCTTACAGAGGTGAGGTGGCAGAGCGGGGTCTTGT
 CTGGCATCACTGGCAGGACAGGCAAGAACTGTCTCTCTCCCTGCTCGGTCTGTGAAGCCTGCAAGCTGCCCTCTGCCCTGG
 AGCTTGAGGACAGGAGCAGGTGGGGAGAGAGACCCCAAGCACAGGAGACGGGTGTGACGCGAGCTGTGGGTGCTGGGGTCCCCAC
 55 CAGACACTTTGTCAAGGCTGCTTCCCGCAGCTCGGCAACGAAAGGCTGGGCTGTCCAGCCATGACGCTTCCCGGCCCT
 TCCCGCAGGTGTGGTTTGTGCTGCCCTCACACTACCTTTCGCTCTCTCCAGACCGGTGTCAACGGGGGCTCTGTGACA
 GACCGCATCAACAGGCCTTCTGCGACTGCTGCCGGCTTCCGGGGCACTTCTGTGAGGAGGACATCAACGAGTGTGCCAGTGA
 CCCCCTGCGCAACGGGGCACTGACGAGTGGTGGGAGTGGTGGGAGTGGTGGGAGTGGTGGGAGTGGTGGGAGTGGTGGGAGT
 60 AGTGGCAGCTTGGCACACCATGCGAGCGTCCGCTAGGCGGCTGGGCACTTAGCGTGGTGCATTGAGTCCAGACATTGTTCA
 TTGTACCGACCTGTCTCTCTGAGAGGGCACTTGTGACTCTCTGTGTCTCCGCAACAGGAGCGCGGTAGTCTGTCTGAAGAA
 CTGGTGGCTTCTCTTATTAGACAACGAGAATCTGTCCGTCTTGTGTTCTTTTGGCGTGTGGCCAGGAAGCTCATTGGTA
 AACGTCAGTCTCGTCTCTGGTTTCTGACGTAATACCTCCCGTGTACAGGAGCGTTTCTGGTTCTCTCTCATTACTTTAAACC
 ACCCTATGCCACCGCTTGGTAAAACCACTCTCGACTGACTTATAAAGAAAGCAGGGGAGGGAGGTGTGACAGTGGTGTGAGAGC
 65 CGGGCCCCGGGTTCCCACTGGCTTCCCTGGGTGAGCAGGCTGCTGGGCTGTCTGGCCATCAGGCCCTAGGGTTGAGCAGA
 AGGGAGGTGTGGCGAGGAGCAATCTGCTGGAGCGGGGACCCAAATGCGCTCCGCTCAGCCCCCGCTGCCACCCCTTGA
 GCTCTGCTTCAACGGTGGCAGCTGCGTGGACGGCATCACTCGTTCACTGCTGTGTCACCCCGCTTACAGGTCACCTG
 CAGCAGATGTCAATGAGTGCAGCTCAGACCCCTGCTGATGGCGGACCTGTGAGGAGCGGTGCGGCTCTACAGGTGACCTG
 70 CCCCAGGGCTACACTGGCCCCAAGTGCAGGTGAGTGGCGGCGCACAGAGGTGCCGAGGAGGGGCTGGGTGGGTGCTGTC
 CTGCGGAGGTGGGAACGGTCAACCCAGGTCCCACTGTGTCGGTCTGGGGTCAACCCACACCCCGGGCAGAGGGTTCTGGGG
 ATCTGAGAGCGCGGTGAAGGAACCTGATGCGGAAGCAGCAGGCACTTCTGTTCAATCCAGGTTTCTGGAGCCGGGGCGGAGCT
 CAGGAATTGGGAATTGAGGAAAGTGTCTCTTAGCAAGAGCGGAGGGTGGTCTGACCTGCTGAGGGCCCTGAGGGAGACCA
 75 GCGGAGGTGTCTCTGGTGTGGGGTGGTGGGGAGTCCAGGGCGGCGAGTCTCCACTTCTGTAGAATGGGTGACGCTGGGTGG
 AACCTTGTGCACTGGTGTGACTCTCGCCCTGCAAGAAGCGGCGGCAATGCTGGCAGACCCACACCCAGTACCGTGGAGTGGCC
 CAGCGCTGAGACGGGCTTACTGCGACCTCCCGAGCTCTCTGTGAGGTGGCTGCGAGCGCAAGGTAACTGTGTGTCACCA
 CCGGCTCGGGTCCAGCCCATCAAGGCTCTGTGGGCTGGGCTCACTGTCTACACCCCATCCCGCAGGTGTGACGTTG

328

TTTACTTTTTTTCTTTTGTGGAGATGGAATCTTGCTATGTTGCCAGGCTGGTCTCAAACCCCTAGGTTCAAGTGATCCTCCCA
 CTTTGGCCCTCCCAAATGCTGAGACGACAGATGGGAGCAACCTCACCTGGCAAGCGTGACCTGTTACTTTGGCCGACTCAGAGGC
 GGCTCTCTGCTCTCCCTCGGTGGCACTGCTCTGCCAGCGCCCCACAGGTCCTCCCGAGTGACCACAGGGCAGAAATGGCCCTCACC
 CCACGCCAGGGGCATCCCCCGGCACTGCTATTATCTGTTTTACACATGAGGAAGCTGGGGCTCAAAGAGGTTAGGCGACTTA
 5 GCAAGTTTCGCCCATCTCACTGAGCCAGGGCTATGTGATTCCCGTCCGTGTCAAACCCAGAGGAGTCACTGGCCCTCAGAGGAGCA
 GGAAGGCTGTAGAGTTGATGCCATCCAGCTGGTGACTTTTTCAGACAGGGAGACGGCTGTCTCAGAGGGGAGAAGGGGTTGTTGG
 GCCACTTTGCCAGGAGTCAATACCATGGCCAGCTGGCATCGGATACTTTGCCAGGAGTTAATGCCACGACTGGCCTGGCATCGAA
 TACTGGAGCTCTTCCAGCTCCACCGGGCCCTTTTCTCTCCCTATCTACAGTCCCAGGCCACCAAGTCCATGTCCACCACTTA
 AATCATCACTCAATGCTCAGGACTGTCTCTGCTGCTGTGTGTGAACCCCGTGTGTGTGGGTTGTGCCCTCGGGGACTCTCC
 10 CGGTTCTTTGGGACTCTCTGCGTTTCAGCGCTCTTTCTCCTAGGCCACCAAGGCTGCTCTGGGCTGGCTCTCCCTAGCC
 CCTAGCTCGAACCTAACCTGGAGAGCTTTGGGGCCCAACTGGTTGCATCGCTCCTGGCTGAAAAGCTCTGGAAGCTTCTCTAT
 ACTTCCAGACACCACCTGCGGTCTCTTAGCAAGCTACAGAGTCCACACTAGCCTACGCCACTGGCCGCTCACCCTCGAGAAGC
 CTATGTGGACTGTTCACTTCAGCCAGAAATGCTCTTCTCCTCTGCTGTCTCCAGCAGACACTGCATGGTGCCCTCTGTATGG
 GCACCTCTGTGGCCAGCCAGCATCCATGTTCCCGGAGGAGTCTGGGCTGTGTCTCAGGCCACAGCCAGCTCCTAGCA
 15 CTGCTGGGGTACAGCAGGACTCAGCAGACATCTGTGATGGTTTGGGGTAGAGGACTCGTGGGCTTACCAAGACCTCCCTCA
 GCTCAAGGACAGCCAGCAGTTCCTCTGTGGCCCTGGGGCTGCGGTCCAGGTTACTGTGACATCGACATCAGCCTTGAGCTTT
 CTGCTTCATTCTAGTGCTTTTAGCACCTTACATGGTAACTACTGGCTCAATGATTCAGAAAAATGTTCTCTGAGACCTGTCTA
 TGTGCCCAACATCTGAAGATGCTGGAGATGAGGAGCATGACGCTCTGCAAGTAAACAGGCTGTGGCAATGCGCTCAAGTGCC
 CTGTGCTCTCGGGGAGGCTGTGTGTGGAGGATAGCTTGCACACCTGTGAGGTGAGTCCAGGAAGTCTTGCAGGAGGCCGGGAA
 20 AGGGCAAGGCTGTCACTTCTTTACAGGGGAGGAGGAGGCTTGGAAAGGCCAGGTAGCTTGGCCAGGCTGAACACCTGGGT
 AGTGGCTGAGGCTCTGACTTCTGGAAGCTTGCACTACAGCTGGACACACGGTAGTTAGCCACCATTTGCTGGAGCATCTTACC
 TGTGCTCTGCTAGCCAGGTGGGCGCCAAAGGAGATGCTTTGCTGTGCTGGGAGGAGGCTGTGGGACCATTTCCACAGCAG
 CCGAGGACCAAGGACACATGTCCAGGGCGGGGATGCACCTTCAGCCTCATGTACGCCCTGGGAAGGCTTGAAGTGGACAGTGT
 GTCTCGTTCAGCACCTCTGGCAGCACACCGGGCAGCACTCCAGGTTAGGTTGGGGCTCAGAGGTGAGTAGAACACCGGGAAGGG
 25 GTGGCAGCGTGTGAGCATGTTTGGGACCTATGCTGTGTGCTTGGCAGGCTTGTGCATGGAAGTGAAGTGGGACTGAAGCTCCC
 TCCACCTGCCACCATGCCCCCTGGGGGTCTGGCCTTCCCTCACAGAGGTGACTTCTCTCTCTATGAGGTTAAGAAGAGGAG
 CCTGGCCACCTCTGGCCAGCCTGGTGGCATGTGACAGGAACCCCTGAGGGGCTGATGAACAAACCGCACAGGGAAGGATC
 TACGGACCTGCTCCAGATCTGCTCTCTCTCCCTGATTCCAGCTTCCAGCCCTATTCCCTCTCTCTCCAGGAAGAGCTCCGTG
 TCACTGCTCTCCACCTTGGAGGCTTCTATATGTTTTTGCCTGGACACCCAGCTAACCGTCTCACAGAGACTGCCCTTCTCTCT
 30 CTCCAGGCCAAGCCTCCAGCTTCAGCGTCAGGACTAAGGCTCTGTGTGAGGGCTGAGGACAGTGTCCGGCAGGAGCAGGCTG
 CCCAGTAAACCTCCCAAGCACCCAGACATACTGCCACTGCTATTTTACACAGGTAGGAAAGAGGAGCAGAAGCTCACAGTGAG
 GGGCGTCTGCGTTCACTGAGACTGCTGCTCTGCTGGGGCTCCCTGGAGGACCGCCACTGGCCCGCAGTTGTGACGAAAGAGC
 CAGGTCCACCCATCAGCCTCTGGCATTTCAGGCCCCATCATAGGAGGCTATAAGCACAGGCTAGGGGTGCTGAGTGCCTGCCCTC
 TAGAACCAACATGTCCAGTGGAAATGTAAACACAGCCCCATGTGGAGTTTACATTTCCAGCAGCTATGTCAAAAACAAAGAAA
 35 CAGGTGAATAAATAAATAAGTATTTTGTAACTGATACATCCAAGATATTGTCAATTTAATATGCAATAAATAAATGATTGAT
 TCGATATTTGCTACTCTTCAACCTACCATGTAGTTTACACTCAGAGCCAGCTCAGTCTCACAGCAAGCACAGCGGCCCGGCTG
 CTGACACAGCATGGCTAATGGGAGGAGTGCACCCGTGAGGACCAAGGTCACGCTGTGACCAAGGCTGTGGTGAACCAAGGAGCAG
 CGGGTTTCTGGCACAGCCTGGAGGTGCACAGCCTGTCTGTGTGCTCTGCATAATGTGGTACAGCAGTGTCTCACAGAGCTTGTG
 ACCAGATGCTGATTCAGCCCACTAGGGGGTTTCAGGGAAGTGGTGACATTGTGTCCAGCTCCAGGTGTGAGCAGGGGACAG
 40 ACTTGGAGAACTGGAGAAACACAGCGGATGTGTCAGGCAAAAGCCCAACAGGAATAGTGATGGCCACACCGCGGGAC
 ACCTCCAGCACTGGGTGGAGGCTCTGCTGGCTGCGAGTCACTCACCTGATGTCCCATTCGCCCTGCCATGCTTGTGTCTG
 GCAACCCATTTTCAGCCCTGAAACGTTTAGGTGCTCATCTGTCTATCTTAGAGATGAAGACCTGATGCTCAGAGACTAAGGAAT
 TTGAAAACAGGACACACAGCTCTCAGGGGAGGCTGGGCTTCAACGGAAGGCTCTATGGCCAGAGGCTGGATGGGCTCGGTTG
 45 AGGGTGACAGAACCTCCACTCCACATCAGGCTACAACTGCTGAGAGCTGTCTCCGTGCACTCAGGATTAGGGAGAAGAGGGGA
 AGAAAGACAGCCGCGCCCTCTGAGGTGATGTGGTATTACACCCCTAGGAGCCAAAGAGGCGCTGTCTAACATCTCTGCCCT
 GAGGTCCAGAGACTTGCATTTATGCTAGGGCAGGTTGGTTTCTGAGCTATGGTCTCTCCATAGCTTAGTGCCCAACCCCG
 TGGACCAACAGGTTTCGAGGACCTAGAGGGTGCAGCCCTGGGCTCTGGGCTCTTGGGTTCTTTGAACCTCGGACGCGCAAAAG
 GCGAGCCCAAGCCTGAGAGGACGATCCACCTCTGCATCCCTCTTTGGAAGGGGCAACAATGACACCTCTCTCCGCGAGGG
 50 TGCAGAGCGCTCGACCACTGGGAAGAAGCAGATGGGGGAGCGGGCTGGGGCTGGGCCCTACACGCTGCTCCCTAACTCTGTTT
 AAACAGGTCAAGAACTGACTCTCTGAAAGCAAAATGTTAGCTGAGCAGATTGGCCCTGGTGCCACGTGAGCCGCTGAAAGCTCT
 CCTGCACCGCTGCGGCCCTGTGGCGTGGCAGGATATCACCCCTCCCTCACAGCGCGCGGCCAGCTGGGGACAAAGGTGGC
 TCCACCCAGGAGGACCTCAGCCGTGTGGGAGTCTCAGCTCCCGCATGCCATCGGGCGGGACCCCAACACCGGCGCTGCC
 CTCTGGAAGGAGCAGCAGAGGAAGGCGCGGCTCTCCCTGCGCTTGC

55 HUMAN SEQUENCE - mRNA
 AGGCCCCGCGATGCTCCAGCCCGGTGAGACCTGCCTGAATGGCGGGAAGTGTGAAGCGGCCAATGGCACGGAGGCTGCGCTCTGTG
 GCGGGGCTTCTGTGGGCGCGGATGCCAGGACCCCAACCCGTGCTCAGCACCCCTGCAAGAAGCGGGACATGCCACGTGGTG
 GACCGCAGAGGCGTGGCAGACTATGCTGAGCTGTGCCCTGGGCTCTCTGGGCCCCCTGCTGCTGACACCTGGACAATGCTCTG
 60 CCTACCAAGCCCTGCCGCAACGGGGCACTGCGACTGCTCAGCTGACGGAGTACAAGTGCCGCTGCCGCCCGGCTGAGTCA
 GGAATCTGTGCCAGGCTGACCCGTGCGCTTCAACCCCTGCGCAACGGTGGCCAGTGCCTGCCCTTCGAGGCTCTTACATC
 TGCCACTGCCCAACCCAGCTTCCATGGCCCCACCTGCGCGGAGGATGTCAACAGAGTGTGGCCAGAAGCCGGGCTTTGCCGCCACGG
 AGGCACCTGCCACAACAGGCTCGGCTCTACCGCTGCGTGTGCGCGCCACCCACTGGCCCCAACTGCGAGCGGCCCTACGTGC
 CCTGCAGGCCCTCGCCCTGCCAGAAGCGGGGCACTGCCGCCCAAGGGCGAGCTCACCCAGAGTGTGCTGCTGCTGCGAGGCTTC
 65 ACCGGCCAGAACTGTGAGGAAAATATCGAGATTGTCCAGGAACAACTGCAAGAACGGGGTGCCTGTGTGGACGGCGTGAACAC
 CTACAACTGCGCTGCCGCCAGAGTGGACAGGTGAGTACTGTACCGAGGATGTGGACGAGTGCAGCTGATGCCAAATGCCTGCC
 AGAACGGGGGACCTGCCCAACACCCAGGTGGCTACAACTGCGTGTGTCAACGGCTGGACTGGTGAAGGCTCAGCGAGGAAAC
 ATTGATGACTGTGCCAGCGCGGCTGCTTCCAGGCGCCACCTGCCATGACCGTGTGGCTCTCTTACTGCGAGTGTCCCATGG
 CCGCACAGGTGTGCTGTGCCACTTCAACGACGATGATCAGCAACCCCTGTAACGAGGGCTTCAACTGCGACCAACCCCTGTCA
 70 ATGGCAAGGCACTGTGCACCTGCCCTCGGGGTACACGGGCTACAGGGCCCGGCTGACGACAGGACGTGGATGAGTGTGCTGCTG
 CCTGCGAGCATGGGGCAAGTGCATCAACAGCTGGGCTCTTCAAGTGCAGTGTCTGACAGGCTACAGGGCCCCCGATGCGA
 GATCGAGCTCAACGAGTGCCTCTGAAACCGTGCAGAACGACGCCACTGCTGGACAGATTGGGAGTTCAGGTGCAATCTGCA
 AAGATCAATGAGTTTCAAGTGCAGTGCACCGGCTTCACTGGGCTCTGTGCCAGTACGATGTGGACGAGTGTGCCAGCACCC
 75 CTGCAAGAAATGGTGCAAGTGCCTGCAAGGACCCCACTTACACCTGTGTGTGCAAGGAGGTACAGGGGACGCACTGCGAGG
 TGGACATCGATGAGTGCACCCGACCCCTGCCACTACGGCTCTGCAAGGACGGGCTGCCACCTTCACTGCTCTGCGGCCCA

5 TGACCTGCGCATGTCTGCCATGGCCCCCACACCGCCCCAGGGTGAGGTTGACGCCGACTGCGATGGACGTCAATGTCCGCGGGCTG
ATGGCTTCACCCCGCTCATGATCGCCTCCTGCAGCGGGGCGGCCTGGAGACGGGCAACAGCGAGGAAGAGGAGGACGCGCCGGCC
GTCTCTCCGACTTCATCTACCAAGGGCGCCAGCCTGCACAACAGACAGACCGCACGGGCGAGACCGCCTTGCACTGGCCGCGCCG
CTACTCACGCTCTGATGCCGCAAGCGCCTGCTGGAGGCCAGCGCAGATGCCAATCCAGGACAACATGGGCCGACCCCGCTGC
10 ATGCGGCTGTGTCTGCCGACGCAAGGTGTCTTCCAGATCCTGATCCGGAACCGAGCCACAGACCTGGATGCCCGCATGCTGAT
GGCAGGACGCCACTGATCCTGGCTGCCCGCCTGGCGGTGGAGGGCATGCTGGAGGACCTCATCAACTCACACGCCGACGTCAACGC
CGTAGATGACCTGGGCAAGTCCGCCCTGCACTGGGCCGCGCGTGAACAATGTGGATGCCGAGTTGTGCTCTGAAGAACGGGG
CTAACAAAGATATGCAGAACAACAGGGAGGAGACACCCCTGTTTCTGGCCGCCCGGGAGGGCAGCTACGAGACCCGCAAGGTGCTG
CTGGACCACTTTGCCAACCGGACATCACGGATCATATGGACCGCCTGCCGCGCAGATCGCACAGGAGCGCATGCATCACGACAT
15 CGTGAGGCTGCTGGACGAGTACAACCTGGTGCGCAGCCCGCAGCTGCACGGAGCCCGCTGGGGGGCAGCCCAACCTGTGCGCCCC
CGCTCTGCTCGCCCAACGGCTACCTGGGCAGCCTCAAGCCCGCGTGCAGGGCAAGAAGGTCGCAAGCCAGCAGCAAGGGCTG
GCCTGTGGAAGCAAGGAGGCCAAGGACCTCAAGGCACGGAGGAAGAAGTCCAGGACGGCAAGGGCTGCCTGCTGGACAGCTCCGG
CATGCTCTCGCCCGTGGACTCCCTGGAGTCAACCCATGGCTACCTGTGACAGCTGGCCTCGCCGCCACTGCTGCCCTCCCGTTCC
20 AGCAGTCTCCGTCCGTGCCCTCAACCACCTGCTGGATGCCCGACACCCACCTGGGCATCGGGCACCTGAACGTGGCGGCCAAG
CCCGAGATGGCGCGCTGGGTGGGGGCGGCCGGCTTTGAGACTGGCCACCTCGTCTCTCCACCTGCCTGTGGCCTCTGG
CACCAGCACCGTCTGGGCTCCAGCAGCGGAGGGGCCCTGAATTTCACTGTGGGCGGGTCCACCAGTTTGAATGGTCAATGCGAGT
GGCTGTCCCGGTGCGAGAGCGGCATGGTGCCGAACCAATACAACCTCTGCGGGGGAGTGTGGCACCAGGCCCCCTGAGCACACAG
25 GCCCCCTCCCTGCAGCATGGCATGGTAGGCCCGCTGCACAGTAGCCTTGCTGCCAGCGCCCTGTCCAGATGATGAGCTACCAGGG
CCTGCCAGCACCCGGCTGGCCACCCAGCCTCACTGGTGCGAGCCAGCAGGTGCAGCCACAAACTTACAGATGCAGCAGCAGA
ACCTGCAGCCAGCAACATCCAGCAGCAGCAAGCCTGCAGCGGCCACCACCACCACAGCCGCACCTTGGCGTGAGCTCAGCA
GCCAGCGGCCACCTGGGCGGAGCTTCTGAGTGGAGAGCCGAGCCAGGCAGACGTGCAGCCACTGGGCCCCAGCAGCCTGGCGGT
GCACACTATTCTGCCCCAGGAGAGCCCCCTGCCCCAGTCCGCTGCCATCCTCGCTGGTCCACCCGTGACCGCAGCCAGTTCC
TGACGCCCCCTCGCAGCACAGCTACTCCTCGCTGTGGACAACCCCCAGCCACAGCTACAGGTGCTGAGCACCCCTTCTCTC
ACCCCGTCCCCTGAGTCCCCTGACCAGTGGTCCAGCTCGTCCCGCATTCACAGCTCTCCGACTGGTCCGAGGGCGTCTCCAGCCC
25 TCCACACAGCATGCAGTCCAGATCGCCCGCATTCGAGGCGCTTCAAGTAA

335

336

337

5 MOUSE SEQUENCE - mRNA
GATTGGGGTACGCGCTGCGCCAGGTTTCCGCACCAACGAGAGCTGGATAACTCTAGACTTGCTTCCCTTGCTGTGCCCCCTCCAGC
AGACAGCCAGCAGCATGTCCTTCAACGTGAACCTTACCAACAGAGCACTATGACCTCGACTACGACTCCGTACAGCCCTATTTCATC
TGCGACGAGGAAGAGAATTTCTATCACCAGCAACAGCAGAGCGAGCTGCAGCCGCCCGCGCCAGTAGGAGATATCGGAAGAAATT
CGACCTGCTTCCCAACCCCGCTGTCTCCGAGCGCGCGCTCGGGGCTCTGCTCTCCACTCTATGTTGCGGTGCGTACGCTCTCTT
10 CCCCAGGAGGACAGCATGACGCGCGCGTGGCACTTCTCCACGCCGATCAGTGGAGATGATGACCGAGTATTCTTGGAGGAGAC
ATGTGTGAACAGAGCTTCTATCTGCGATCTGACGACGAGACCTTTCATCAAGAACATCATCATCCAGGACTGTATGTGGAGCGGTTT
CTCAGCCGCTGCCAAGCTGGTCTCGGAGAAAGTGGCTTCTCACCAGGCTGGCGCGCAAGACAGCACCGCTGAGCCCGCGCCGCG
GGCAGCGCTCTGCTCCACTCCAGCTGTACTCTGAGGACCTCAGCGCGCGCGTCCGAGTCTGACCCCTCAGTGGCTCTTT
CCCTACCCGCTCAACGACAGCAGCTCGCCCAAATCTGTACTCTGTCGATTCCACGGCCTTCTCTCTTCTCTCGGACTCGTGCT
15 GTCTCTCGAGTCTCTCCCAACGGGCGAGCCCTGAGCCCTAGTGTCTGCATGAGGAGACACGCCCAACACAGCAGGACCTCTGAAG
AAGAGCAAGAAGATGAGGAAGAAATTTGATGTGTGCTGTGGAGAAGAGGCAAAACCTCTCGCAAGAGGTGCGAGTGGGCTCATCT
CCATCCCGAGGCCACAGCAAACTCCGCAAGGCCCTGCTGCTCAAGAGGTGCCACGTCTCCACTACCAGCACAACTACGCCGC
ACCCCTCTCACAAGGAAGGACTATCCAGCTCGGAGAGGGCGCAAGTTGGACAGTGGCAGGCTCTTGAAGCAGATCAGCAACAA
GCAAGTGCTCCAGGCCCGAGCTCTCAGACCGGAGGAAAACGACAGAGGGCGGACACACACGCTCTGGAAGCTCAGAGAGGAAC
20 GAGCTGAAGCGAGCTTTTTTGCCCTGCGTGACCATCTTGAATTTGAAAAACACGAAAGGCCCCAGGTAGTGATCTCAA
AAAAGCCACCGCTACATCTGTCATTCAAGCAGACGAGCACAAGCTCACTCTGAAAAGGACTATTGAGGAAACGACGAGAAAC
AGTTGAAACCAAACTCGAACTCGAACTCTGGTGATAAACTGACCTAATCTCAGGAGGAGCTGGAATCTCTCGTGAGAGT
AAGGAACAGGTTCTCTTCTGACAGAACTGATGCGCTGGAATTAATAATCATGCTCAAAGCCTTAACCTCACAACTTGGCTGGGGCT
TTGGGACTGTGAAGCTTCAGCCATAATTTTTAATGCTCAAACTTAATAGTATAAAGAAATTTTTTTTATGCTTCAACTCTTTT
25 TCTTTTTCTTTTTTACAGCTATTGATTTAATTTGTTTTTTTTAAAAAACTTAAAAATCTAACAATTTCCCTGTAATATAGGCCT
TGAAATGTAATAAATCTTTAATAAAACGTTTTATAACAGTTAAAAAAATAAAAAATAAAAAATAAAAAATAAAAAATAAAAA

30 ATGCCCTCAACGTGAACCTTACCAACAGGAACTATGAACCTCGACTAGCACTCGGTACAGCCCTATTTCATCTGCGACAGGAAAGA
GAATTTCTATCACCGACCAACAGCAGGAGCGATGCGACCGCCGCCCGCCAGTGAGGATATCTGGAAGAATTCCGAGCTGCTTCCCCA
CCCGCCCTCTGTCGCCAGAGCGCGCGCTCGGGCTCTGCTTCCATCTTATGTTGGCGGTGCGTACGCTCTCTTCCGCAAGGGAAGAC
40 GATGACGGCGCGGGTGCGAACTTCTCCACCGCGATCAGCTGGAGATGATGACCGAGTTACTTGGAGGAGACATGTTGAACAGGAG
CTTCATCTGCGATCTCTGACGACGAGACCTTCATCAAGAACATCATCTACGAGATGTATGTGGAGGCTTTCTCAGCGCTGCCA
AGCTGGTCTCGGAGAAGCTGGCCTCTACCAGGCTGCGCGCAAAGACAGCACCAGCCTGAGCCCCGCCCGCGGACAGCGTCTGC
35 TCCACTCCAGCTGTACTCTGAGGAGCTCACCGCGCGCGCTCGGAGTGCAATTGACCCCTCAGTGGTCTTCTCCCTACCGCTCAA
CGACAGAGCTCGCCCAAACTCTGTACTCTGTCGGAATTCACGCGCTTCTCTCTCTCTCGAATCGCTGCTGCTCTCGGAGTCT
CCCCACGGGCAGCCCTGAGCCCTAGTGCTGATGAGGAGACACCGCCACCACCGACAGCGACTCTGAAGAAGAGCAAGAAGAT
GAGGAAGAAATGTAGTGGTGCTCTGTGGAGAAGGCAAAACCCCTGCCAAGAGTCCGAGTCCGGCTCATCTCCATCTCCAGGAGCA
CAGCAAACTCCCGACAGCCCATGGTCTCTCAAGAGTGCCACGTCTCCACTCACCAGACCAATACGCGCGACCCCCCTCCACAA
40 GGAAGGACTATCCAGCTGCGCAAGAGGGCCAACTTGGACAGTGGCAGGCTCTGAAGCAGATCAGCAACAAACCGCAAGTCTCCAGC
CCGAGCTCTCAGACCGGAGAAACGACAAAGAGCGGACACACAAAGCTTTGGAAGCTCAGAGAGGACCAAGCTGTGAAGCGAG
CTTTTTTGCCTGCGTGACAGATCCTGAAATTGGAAAAACAAGAAAGGCCCCCAAGTAGTGATCCTCAAAAAAGCCACGCT
ACATCGTCTCAATTCAAGCAGACGAGCACAGCTCAGCTCTGAAAAGCACTTATTGAGGAACGACGAGAACAGTTGAAACACAAA
CTCGAACAGCTTCGAAACTCTGCTGCATAA

ACTCCCACACACCTATTCAACATAGTATTGGATTCCCTGGCCAGAACAAATTAGGCATGAGAGAGAAACAACAGGCATCCAAACAA
GAAGAGAGAAGGTCAAATATTCCCTGTTTGCAGACAATATGATTCTGCATCTAGAAAACCTCATAGCCTCGCCCGGAAACTCCTT
50 GAGTTGATATCAACTCTCAGCAAAAGTTTCAGGATACAAGATCAAGTACAAAATAGTAGCACTCTTATCACTAACATCACCCA
AGCCAAAGGCAAACTCAGGACAACAAATCCCATCCACAATTTGCCACAAAATAATAAAAGCTTAGGAATACAGTTAACTAGCGAGGT
GAAAGATCTCTACTATGAGAATATAAAAAACACTCTTCAAAGAAATCAGAGATGACCCAAACAAATTGGAAGAACATTCATGTTCAT
GGAAGGGAAGAATCAATATTGGTAACTGGCCATACACCTTCAAAAATTTACAGATTCAATTTTCTTCTATCAAACTACCAAT
ACATTCTACAGAAATGGAAATTAACACTCAAAAAATTCATATGGAGCTAATAAAAGAGCTATAATACACAGGCAATCTAGGCA
55 AAAAGAGCAAAGCTGAAGGAATCACATTGACCAACTTCAAAATGTACTACAGGATGTAGTATAACAAAACAGCATGGAATCTGATAC
CAAAACAGACATAGACCAATGGAACAAATATGTGACACAGAAATAAGGCCATACCTTACCAACCTATGGACTCTTGGACAAATC
TGACAGAAACAGCAAGGAGGGAAGAACTCCCTATTAAATTAAGTGGTGTGTGATTCTGGTTAGCCATATGAAGAAAACTGAAAC
TAGACTTATGCCATATATAAAATCCATATGCGGAAAGCTGAGGCAGGAGAAATCACTTGAACCCGGGAGGTGGAGGTTGCAGTGAG
CCGAGATCACACTACTGCTACGCTAGCCGTAGCGACAGAGTGAGACTCGTGTGCAAAAATAAATAAATAAATAAATAAATAAAT
60 AAATAAATATCAACTCAAGGTGGATTAAAGACCAAAATGTAAACTCTAAAATCTAAAAACCTTGAAGATACCTTAGGAAATAC
CATTTTGGACATAGGAGCTGACAACGATTTTTTGAAAAAAACACCAAAGCAAAGTTGACAAATAAGACCTATTAATTAACATAAGA
ACTCTGCGACAGCAAAAGAACTATCAACAGAGTAAATAAGGCAAGCTGCAGAAATGGAGGAAATATTGACAACTATATATGTGAC
AAGGCGCTAATATACAAAACTCAGGAGCAATCTAAACATACAGGAAAAATCAACAACCCACCTCACTAAAAAGTGGGAAAAAGGA
CATAAACCGACACGTTTTCAAAGAAGACATACAAGCATATACATACAAGCCAAACAGCATATGAAAAATGCTCATCATGACTAAT
65 CATTAGAGAAATGCAAAATCAAAAGCAAAATAGATACCATCTCACATCTGAGTACAGTAAGCTATTTAAAAAGTTAAAAAATCAC
GATGCTGGTGAGGTTGGGACAAAGAGGAACGCTTATACCTGCTGGTGGAGTGTAAATAGTTTCAACATTTGTGGAAAGCAGTG
TGGTGATTCTCAAGTAATTAATAACAGAACTACCATTGTGACCAGCAATCCCACTACTGGATATAAACCCAAATAAATAAATAATC
TTTCACACGAAAAACATGCAAGCATGTGTTTCATTGTAGCTCTATTACCAATAGCAAGGCATGAAATCAGCCTAAATGCTCAA
CTACTGCGAGCTGGATAAAGAAAAATGTGTGATACATACACAGATGCAATTATAGCATCTATAAAAAAAAAGAAATCATGTCC
70 TTTTCAGGAACATGAATGGAATCAGAGGCCATTATCCTTAGCAAACTACACAGGAACAGAAAAACCAACCTATGTTTTCATTAT
AATTGGGAGCTAATAATGATAACCCATGGGCAGAAAGAGGCCCTCACATCTGGAAGCCCTCGGTGAAGGAGGAGGATGGGAGGAGAA
AGAAGTCCAGGGGAAAAAAATCTCGGTGATCTGTGCTTAGTACCAGCAGCAAAATAATCTGTACACATTGATGGGAGTATCTCA
AAATAATAAGACTCTATGACAAAAACACAGCAATATCTACTGTAATGGGCAAAACCTGGAAGCATTCCTTTGAAAACTGGC
ACAAGACAAGGATGCTTCTCTCACCACCTCTATTCAACATATGTTTGGGAAGTTCTGGCCAGGCGCAATCAGGCAGGAGAAAGAAAT
AAAGGCTATTCATTATGAAAAAGAGGAAGTCAAAATGTCTTGTGTCAGATGACATGAATTTGATATTTAGAAAAACCCCATCGTCT
75 CAGCCGCAAAATCTCTTAAGCTGATAGCAACTTCAGCAAGTCTCAGGATACAAAATCAATGTGCAAAAATCGCAAGCATCTCTT

5 TACAACAATAACAGACAGAGAGCCAAATCCTGAGTGAACCTCCATTCACAATTGCTTCAAGAGAATAAAATACCTAGGAATCCAA
CTTACAAGGGATGTGAAGGACCTCTTCAAGGAGAACTACAAAACACTGTTCAATGAAATAAAGAGGACACAAACAAATGGAAGAA
CATTCCATGCTCGTGAATAGGAAGAAATCAATATCGTGAAGAACGGCCATATTGCCCAAGGTAAATTTATAGATTCAATGCCATCCCA
TCAAGCTACCAATGACTTTCTTACAGAAATGGAAATACTACTTTAAAGTTTATATGGAACCAAAAGAGAGCCCGCATTTGCCAAG
TCAATCCTAAGCCAAAAGAACAAAGCTGGAGGCATCAGCGTACTGACTTCAAACTATACTACAAGGCTACGTAACCAACCAACAGC
10 ATGTTACTGGTACCAAAACAGAGATATAGACCAAGGAAGAGAACAGAGCCCTCAGAAATAATGCTGCATATCTCAACCATCTTA
CCTTTGACAAACCTGACAAAACCAAGAAATGGGAAAGGATTCCCTATTTAATAAATGGTGTGGAAAACCTGGCTAGCCATATGTA
CAAAGCTGAAAACCTGGGTCCCTTCTTACACCTTATACAAAATTAATTCAGATGGATTAAAGACTTAAATGTAGACCTGAAACC
ATAAAACCCCTAGAAGAAAACCTAGGCAATACCCTCAGGACATAGGCATGAGCAAGGACTTCATGTCAAAAAACCAAAAGCAAT
GGCACAACCTAAAAGATGGGAGAAAATTTTGAATCTACTCATCTGACAAAAGGGCTAATATCCAGAATCTACAATGAACTCAAAACAA
ATTTCAGAAGAAAACCAAAACCCCATCAAAAGTGGGTGAAGGATATGAACAGACACTTCTCAGAAGAAGATATTTATGCAGC
CAAAGACACATGAAAAATGCTCATCATCACTGGCCATCAGAGAAATGCAAAATCAAAACCAATGAGATACCATTTACACCCAG
TTAGAATGGTGTATTAATAATGTCAGGAAACCAACAGGTGCTGGAGGATGTGGAGAAACAGGAACACTTTTACCGTGTGGTGG
15 GACTGCAAAACAGTTCAACCATTTGTGAAGTCAAGTGTGGCGATTCTCAGGGATCTAGAATAGAAATACCATTTGACCCAGCCAT
CCCATTACTGGGTATATACCCAAAGATTGTAAGTCAATGCTGCTATAAAGACATGTGCGCACGTATGTTTATTGCGGCATATTCA
CAATAGCAAAGACTTGAACCAACTGAAATGTCATCAATGATAGACTGGATTAAAGAAATGTGGCACAATACCCATGGAATAC
TATGACGCCATAAAAAATGATGACTTTCATGCTTTGTAGGGACATGGATGAAGCTGGAAACCATCATTTCAAGCACATCTCTCA
AGGACAAAAACCATACACCACATGTTCTCACTCATAGGTGAGAAATTAACAATGAGAACAGATGGACACAGGAAGGAAACATCA
20 CACACCGGGGCTGTTGTGGGTAGGGGAGGGGGATGGATAGGATTAGGAGATATCTAATATTAATGACGAATTAATGAGT
GCGGCACACCAACATGGCACAATGATATACATATGTAACAAACCTGCACATTTGTGCACATATACCCATAAACTTAAAGTATATAA
AAAATCTGTACACTAAACTCCAAGTCATGAGTTTACCCATATAAAAAACCTGAACCTAAAAATAAAGTTAAATATTTCAAAATATA
ATAAGTAAATAAATAAATGACAAACCCATGGCTAACATCATGTTGAATAAGGAAAAGTTGAATGCTTTTTTTCTAAATCCAG
GAGAAGACCAAGATGTCATTCTCTCTTACTCAACATGGTACTGGGACTTAGGTAGAACAATACCAAGAGAATGAAATAA
25 AGGTCAATCAAATTGGACAGGAGGAAGTCTTTCTGCACTAACATGATCTTATAGGTATAAAACCTATAGACTCAACCAAGAA
AAATAACTGGTAGTATTGATAATGAATTCAGTAAACCTCAAGTTACAAATTTAATGTACAAATATAGTAGTGTCTTACACAG
CAACGACCAACTCTGAAAAAGAAATCAAGAAATCTATCTCTTTTACAATAGCTACAAAAATTTCAAAAAATTTCAAAAAATACC
TAGAAATAAATTTAACCAAGGAGGTGAAGATCTCTACAGTAAAAATAAATAAATATGGATGAAGAAATGAAGAGGATACTAA
TAAATGTAAGTTAAACCATGCTCATAGATTGTAGAGTTAATGTTGTTAAATGTCCATACCTACCAACCAATGTACAGATACA
30 ATGCAATCTCTATCAAAATACTAAGGACTTTCTCAGAGAGTAAAAATATATATATTTTAAATATATAAATGTATATATAA
TAATATATAATATGAATATTTATATATGATTA
TATTA
CTATATATTTAT
AT
35 AT
CCACATGATTTCCAAACAGCCAAAGCAATCTGGAGCACAAGAACAAAGCTAGATGCAATACACTACCTGGCTTTAAATTTCTAC
AAAGCAATAGTAAACAAATAGCATAGTACTAACATGAAAACAGATCCATAGACTGATGGAGGAGAAATAGAGACCCCAAAATGAA
TCCATACAATTTATAGCCAACTAGTTTGTGACATATGTACCAAGAAACACATTTGGGGAATGGAAAGTCTCTGCAATAAATGGTGT
GGATAAATGAAATATCCACAGCAGAAAGAAAGAACTAGGTGCTTCTCTCTCCACATATAAAAAATCAACTCAAAATGGATTAA
40 GACTTGAATATAAAACATGAACTAAGAAGATCCTTGAAGAAAACACAGGGGAAACAAATTCATGATATTGGTCTGGGAAAGATTT
TTCAAAATAAGACTCAAAAGCACAACCAACCAAGCTAAAATAGATGAATGGGATAATCAAGCCAAAAGCTTTTACATCTTAA
AGGAACCAACAGAATGAAGAAATGACCTACAGAATGAAGAAATATTCACATATGCTGACAGAGGTTAATATGAACTAT
GTAATCAATGCAAGCAACTCAATAGGAAACACACAATAATCCAATCAAACTTGGGCAAGGATTCGAATAGATATTTCTTAA
GGATGTCACCAATGGGCAGCAAGTATATGAAAAAGGCTCAACATCACTAAGAACCAGGGAATGCAAAATCAACCCAGCTGAG
CTATCCACTCATCCAGTTAGAATAGTTATTATTTAAAAAATAAATAAAGACAAAGAAATGGCCAGTCATGGTGGCTCATGC
45 CTGTAATCCAGCATTTTGGAGGCCAAGGAGGCGAGTCACTTAATGCCAGGAGTTCAAGAACAGCTGGCCACAGTGCAGCAAAAC
CCATCTCTACTTAAATAACAAAAATAGCTGGGACATGCTGGGACATGCTGCTGGTCCAGCTACTCAGGAGGCTGAGGACAGAGA
ATTGCTTGAACCTGGGAGGCAGAGGTTGCACTGAGCTGAGTTGCGACCACTGCACTCCAGCTGGGTGCCAGAGCAAGGATCTGCC
AAAAAATA
CTATACACTTGGTGTACTACTATATATATCAGCAATCCCCTGCTGGATCCCCCTCCCCCAAAATGAAATCAACATATCAAA
50 AGTTAGATCCCCATGTTTATTGCAACACTATTGCAATAGCCAAAATATGGAATCAACTTAAGTGCTCATCAACAGATGAAACAG
GAATGAAATATGTTATATATACCAATGGAATGCTATTCAATCTTAAAAAAGAAATGAAACCTCAAAAGTGGGTGAAGGACAT
GAACAGACACTTCTCAAAGAAGACATTTATGACGCCAAAAACACATGAAAAATGCTCACCATCACTGGCCATCAGAGAAATGC
AAATCAAAACCAATGAGATACCATCTCACACAGTTAGAATGGCAATCATTAAGAGTCAGGAAACACAGGCTGCTGGAGAGGA
TGTTGGAGAAATAGGAACACTTTTACACTGTTGGAGGAGCTGTAACTAGTTCAACCAATTTGGAAGTCAGTGTGGCGATTCTCAG
55 GGATCTAGAATAGAAATACCATTTGACACAGCCATCCCATTACTGGGTATATACCCAAAGGACTATAAATCATGCTGCTATAAAG
ACACATGCACACGTATGTTTATTGCGGCATATTCAAAATAGCAAGACTTGAACCAACCCAAATGTCCAACATGATAGACCGG
ATTAAGAAAATGTGACACATATACACCATGGAGTACTATGCGCCATAAAAAATGATGAGTTTATGTTGAGGAGCATGGATG
AAATGGAAGTCATCATTTCTAGTAACTATCGCAAGAACAAAAACCAACACCATGTTCTCACTCATAGGTGGGAATGGAAC
AATGGAACACATGGACACAGGAAGGAGAACATCACACTCTGGGACTGTTTGTGGGTGGGGGAGGGGGAGGGGATGCTTTAGG
60 AGATATACCTAATGCTAATGACAAGTTAATGGGTGAGCAGCACCAGCATGGCAGATGATACATATGTAACCTGCAATG
TGCATGTACCTAAAACCTAAAAGTATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATA
GAAGATGATAAAGTATGCCAAAAGAAAGCAATGCTATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATA
CTGTCAATTTGCAACATGTGGACAAACCTAGAGGACTTTATGTTAAGTGAATAAACAAGCAGAACGAGAACTACCACATGAT
CTCAGGCATATGTGGCATCTAAAAAGTTGACCTCAAAGAGAGTTTAGTAGTGGCTATCGGAACTGAGGAGAGTAGTTGCGAGG
65 GGAGGGGAACAGGTTGCTCAACAGCTACAAAGTTACACTTATATAGGACAAATAATTTCTGATAATCGACTGCACAGTAGGTTGAG
TGATGTAACAAATAATGTTATGTTGACTTTAAATAGTTAGACAGAGAGGATTTGGACGTTCTACCACCAAGAAATGACAAATGT
TTCAGGTGATAGACATATGCTAATTATGCTGATTGATCATTACAAATATATATGATCAAAACATCACTGTATCCCATTAAAT
ATGTAACAATATACATCAATTTAAAAAATAAATAAATGATTTTAAAAATTTTAAACTTCAACGAGCAAGTTTGAATCTCCTTA
TTCAGATTTTGGTCAGCCCTACAGGTATACCAACAGGCTGGCCCTGGGCTGCTGTTAGAGGAAAGAAAGAAACATCTGGACTT
70 GGAATGAACAGATCTGGAAGGAATCCTAAATTTTCAATAAAGTCTCTGTATTCTTTTCTCTGCTCCCTACCCAGGAAGCAGTC
TAGAGGAGATGATCCTTTCTAAGAACAGCAACATTGATTAACAACTTCTTACTAATGTGTGGATCAAGAGATGGTGAGGA
AAGTAGAGTCAGTGATATTTTGAATCAATTATGAGAAGGCCACCATGCTATTGCTCAGTAATATTAGTGCCCATGAGCAATGAG
ATTCAATCGATGGTCCGTCTTTATTATTAGGTCACTAGTGGCTTTTGAATAAATAACCATTTGGCAGAAATAAATAATTTCT
75 CTAATGCAAAACATAGCATGGATTGTTTTAAGGGGCACAATAGTGTGCTTGATCAGACTGGAATAGCAACATTGTAATCTGAAA
AAAGCTCAACAGTGGTGAGGCATATTCAAAGCCCCAAGAGGAGATCAACAGTCAGATCCATCAGAGTTGAGAGGTTGCCACAA

TTATGTAATGACGCTCCACGCCATGAACACATGTGTGTCAGCTTTTGTGTCAGGAGTCACAGATCTGGCATGCAGCAGGAGATCTTGC
ATTAGATATATAAAGTCAGGCCCAATCATCCCTTGATTAGTTAGTCTCATCAGAGAAATGAGCCCTTGCCATGGGTCTGTATATGA
GGATCCAGGCAGTTCAGTAAGTAGTCAAGATTTGTTTCCACATGCGGTCCCAAAGAAGTCTTTAATCTGACAGACTAGTTTCCCA
AGTGGCATACCAAAGGCTGGACCATTTGGTAGTGTCCCAAGAAATGGGTCTTGACCATTTAGCAGAGAAACCAAGTCTCTTTT
5 TTTCTGCATAGCTGGTTTTCAGAGGCTGAACAGACACAGGAGCCAGTGAAACCATCAGTTTTCAGCTTAGCCAACTCTTCACTGAGG
CAAGCCCAAGATATTTGGGAAACCTCTGTAACAGGGTCCAAATGAACTAGTAGTGTGTTTCAAGCAGGAGAAATAAAGGTTAAG
TTTCCCCCAGAGAGACAGTTGCCACTCTTACATATAAAGCAGAGATGCAGAAAGAAATTCGAGTTGATGCCATCGCCACCCACCAA
CCCACCCCGCATTTCCGCCCTGAGACTAGGATCCAGCGCCAGGGACCCAGACCCTGGGATTGATCGCACAGAGCCGTGATCCGG
10 AGAGTGCGCCGGGGATGAGACGGAATCTCGGGGCCACTCGAGAGCTTGGGGCAGGAACCATGCATCCATTGTCCATCGTGACTGCA
TGTGGAGCAGCTATTTGGCCTGGGAACAGCTGTAGAGAGCGGGAGCGACTGGCTCGCCACTGGCGCGCCCTGGGGAAACCCGCC
AAGGTGCCCTCTCTCCAGACTGCCCTCCAGCCTCGAAGACGGCAATCCAGCCTCACTGTCTCCCTGGAATCTGGGCAAGGCCAA
GACTCAGGCTGCTCCGATTTGAGAACCACAACTCAGAGGGTGGAGAAATGACCTTGTGACAGCAAGAAAGGCAAGTTG
15 GGTTCACAGAAATCGATCACCATCATGGTTTCAGTAGACCGTCTGAACCCCTGCATGAAACACTTCCATACCTCCATCCACAGCA
ACAACACAATCGCGTCCCATATTTCTCCAGAAAGCTGCTCCCAAGAAGAGGCTCCAGAGAGAGGTCTCCAAAGAAGAGGTTCTGG
AGGGAGATGCTCCAGGGGAAACGGAAGATCGAGGAGATGAGGGGATTTGAGGCCCTCACCTATAGAAAGCAAGGCTGCCAGTGC
20 TGCCAGTTCTGACACTGAGGATGTGACCAAGAGGAAGGGCCACAGCTTCTGACAGCAAGAGGTGGAATGACCTGCGCGTTCTCA
GTTCTTGGCCCTGAGGGACAGGTACCCACTTGGCCAGCTGCTTAAGTCCCAAGGTAGTGATCCTAAGCAAGGCTTGGGAT
ACTTGAAGAGCTCGCGGTGAACCGAGAAAGATGTCTATGGAGAAACCGCAATCCAAAGCCAGCAACAGCAATTCAGAAATGA
ATTGCGTACCTCAGTGGTACTAATGACCAAAAGCCTGACTGTTCTATCTTACAAAGACACAAGTTTATTTTGGACCTCCCT
25 TCCCTTTAGTAATTTTACATTTTGGTTATGACGGGACAGTCTTTCAGTAGGTCCAGAAATGCATTGCAGGCAGTACACACAGA
ATAAGGGCTTGCATTTCTTGAACCTTGAACCCAGCTCTTCTCTCCCTGACTCATGTCTGTCTTCTTGGCGCTTCTGGCTT
CTCAGCAGATAGCTGACTGAGGAGATTTGGGCTGTGTTTACCTCACTAGCTCCGAAGAAAGGCTGACAGATACTATGCAACAGGT
GGTGTGTTGTTCGGGACTCCAGCCTGCATGAAATCTCACACTCCGCGTGAGCCTTAGACTAGGAAAGAAATGCTCTCTGTATCT
30 CTGGGTGATGCTAGAAATGCTCCCTGGTATGTCCTGGGTCTATGCAAGGACAGCTGGGCTTGGACAGCACTCTCGTGGGCTTTT
TTTCCAGGAGACACAAAGTGTCTTGGGTGATGACAAGCTTGAAGATTTGATCAACATGACCATTGCTTCACTGTGACACACTTT
ACAGTATCTGAGGAGTTGGAACCTTTAAGCTATATATTGTGATATTAGCTGACACCTCTCCTTCCAGTTTCAATGCTGAGACCT
GAGAACATTTAAAGAGCTTGCATCTAGTTCGTGTCTCAGACTCTCTGGGCTTCTCTGATGAAGGACCTTTCTGTCTCTCAT
35 GAGAGACTTTTGTTCATTTTGCCTTTTGTGTGCAATGGGCTTTACAGCATCTCTTCCACAGGTTAGAAATGTTTCCCAAGTTA
CAGGGAAGTGGGGATCTAGCCTGGGGCTGAGGAATCTTGGAGTCTGGCTCTGAACTTGTTCCTGTGCGAGTGGCACTTGA
GGCCACCATCTTATAATCTCTTCAAGGCAGATGTAAGTCACTCAGAAGGGAGAACTGTACCGCTTCTCTTTCCATGAAGC
TCTTCTGCTCAATCTTGAATGATGATGTTGAATTTACCGGAACCATGCAAAACAGTCCACCTTGGGCACTTCCAAAGGAATTTGT
40 GGGTCTGACAGCATACTTGGCTCCCTACAGCCTGCCATGAGTCATATTTCTTTCCAGAAGGTGGAACTTGTCTCTGTTATGTTT
TAAAGGAGCTGTCAGGAGCTCTGCTTAGCCAATCATGATGATTTTGGCCAGCTGGACTCTGCATGTCCAAAGGAGATCCAGGT
ACAGCTCCATTCGGGAAAGACATCCAGCCAGCAGTTGTCTATGTTGGGTAACTCAGGAACCCCTAACCTGTCTGGGAAAGG
45 ACAAGCCCTCCAGAACTCTGCCAAATAGCAGGTGCTTGTGTTTGAATTTGGAAGGGATGGGGGTGATAAGTACTATCT
GTGGCTCTGGAAGACAGCTGCTACATTCATATTTTCCATAATGGTTTCTTCTGAGGTGCTCTGTTGGCTCAGAGAAATCC
CAGAGGATGTTTGAATAGCCTCTACCTCTCAGGAGCATGGTAGTTTACAGGAACCAACTGACTCTCTGGAATCTGATGGAG
GGAGAACAGGCCAGGTGTAGGTACTAATGCTCTACATGAATAGCTTGGTTTATAAGCTGCTGTTGGGTATATGTTGGGGCAGT
50 CTTTAAATATATGTTATTTTGTACGATTTTGAAGTGGAGTTAACTGTTTGTAAAAGAAAAAAGAAACCTTGGGTGCT
TCTCTGTCTCAATGCTGATGTTTATTTGAAGGCAAGTTTATCTGAAATTTGTATTATGTTGATGTTGCAAAATTTGAATGTTGC
CTTCTGGGACATCTTGACAAAAATATTTCTCAACATGAAGAAAAATAATATAATAAAAAAGAAATGTCTGTTGGGATCAGATGAC
TGTTCTGATTTTACCGTTTCCATTTTCAAGCAAGCTTATTGACCCCTTCTACCTGCTAGTCTAGTCTGAGTGTGACCAAC
55 TCAAGATGGAATATCGAGCCAGATGGTAACAAATCTCCATGCAATCGATTGTTGAGTTTGAAGAAATCCCAATCGAAGCT
TAGCTGCTTTTCAAGGGATGTACCTGTAGCCATATTAGGGAGGCAACAAGTCCAGTTCCTCAAGGGATCTCTCTGGGTGTTGA
CTGCTTCCCTTGGCAGGTGCCCTCATCGGCAAAATCATCAGTTACACAGATTTGTCTGTATGTAATATTCAAGGAGTTGATTGA
GGTCTGAGCCTCTTTTTCGGTGGCAGGTTGTATGAAGAGACGTCAATTTTCTGTTAGAGGATCTAATGTTGTGAATTTGCT
60 TGGTATGCTCCAAAGATTAATTTGGCAAGCAGCCCTGTATTGGGAGCATAAATCAGCCACCTTGGTGCAGATGTAATATA
CACTGCATTGAGGACCTTGAAGTCTGAGACTTCTAGCCGCGCAGCTGACACAATATTATGTTATATAGTGAATATTGAACATTA
GAAGGTAGAGCACTAATGCTAAATCCTGAGCCAACCACTGCTGACAAATCTCATTGGAGTTTGTTCCTAACACTTCCCTCTAC
65 CTCTGCTCTCTGATGGGGATGACTTATATGAGACCTGTAGAAATGAGAAATACAAGCATATGACCCATCAATCTGTCCT
TATAAGTAGAAGCAACAAGACAGTTTATTCAATTTCCCAAAGGCGTCCCTGTACAAAGTCAATTTGGCTTCCAAACCCCACTGT
GAACCATGCCCCAAACCCCACAATTTGCTTTTCTGACTTTTTCCTTAATGAACCTCAGACCTAGAGTTCACTACAGGAATTTCA
GGGTGTACAGCAAGAGCTGTAGGGGATTTCCCTATGTCAGGCCAGAAATGTAGGGATTGAGGGGAGTCTGGGATGAGGGCAGG
70 GGTGGGAGTGTAAAGCCTTTTGTAAATCCCTCTGGCTTTTGGCCAGCTTGTATGCTAAATCCTCTCTGTGTACCTCAATTG
TGCAGAACTGTAAAGGCTCAGGATTTCTCCATTTCTGTCCCTGATTTCCCAAGCAGCTCTGCTCCACAGTCTTGGTCTTTCATC
TACCTCATACCTATTACCCCTTCCCTCCCTCCCAAGAAATCAGATAAGATAGTGTATGGGAGATTATATGAACAGTTCTGTG
AACATGTGAGTCCGTCCTTCTGAAAGTACCCTACCATGCATATGCCCTTTAGTCTGTCTTGGAGCAGAGAGACTTCTGGCTCA
65 CCACTAATCATCTTTCTTCTATAGCACCTGAAGTGAGAAAGGAAGAGAACCAAGGATTTAGGAATGCAAGAGAGAGAGAGAAA
AGACTCTGTCTATACTAGTAAGCAAGGCATGTTGCAATTTGCTTCCAGTAGCCAGCAGTGTGGTTCAACCAACCAACTTCAGAT
GGTTTTTTTCCACTGAAACTCTATATCTTCACTGCTGACGCCACTTATTCAGGTTTGGCAAGTCATTGACTCAGCACCATGACA
75 TCATCCCTTCTTCTCCCATGAGAGGAGAGTGAACAAACCAACCAACCATGATTCAACAGCTTGGTTTAAATCTGCCTCTGCC
CTCAGCTTCAATATAGGTAGGAGAGTGTAGTGGGGAAGGCCCTTTAATGCACTTAGTGCCAAATCCATTGGGAAAGCAATTTGCT
CTCCAATCCCGAGGAGTCTTCTCATATCCCTAACAGGCCAGTGAAGCACCCTTGTTTTATCACTTTCCAGAATGCTATGTTTCA
TCTTCATTACCAAAATGGCAAGAAATGTGAAGATTGAGACTGTACCCTACTTGAAGCTCACAACCTAGCATACCTCAGTTTC
ACAGATGTTGGCAGAAATATATGAGATTTCTGGGTGAGAGTTGTTTGGTTTCAATGTTTGCATTAATCCCTTGGCCCTCTGCCCA
AATCACACAGAGAAATGAGGAGCAGCCAGTCAATGTTGACATAAGTATTCTTCAAACTATAGTTAGAGCAAAAGCTGTATAC
AATAAATGTAGAAAGGCAATGGAACATATCTCAACATATCTGACCATTTGTTCTCCACTATCTTGGCTTCTGACAAAGTTTGGC
ATTAGATATGTTGTTGATTTTCTGGATATCAGGGCTGAGCAAGGAAAGATCATGACCATTAGATGGCAGTAGCACACAACATGC
TTTATTGTTGGCTTTGAAAGGTTTTCAGGAGAGTGAACCTTCCCTCAGCAGGAGAGCTTCCAGAGCCAGCAGCAGCAAGAGCC
70 ACCACCCAGAAGAGGAGAGTTCAAGGCAACTTCCAAAGGAGAGAGAAATGGACAGGAGGCTCATGTGTCTATGGGATGTTACTC
AGCAGCCAGGTGTGGAGTCTCTGTGTGACAGAGTTCCCATGGGCATCAGAGGCTTGGGGCTTTGTCCAGCCCAAGATGTCTCT
ATCTACGGCTAGCAGATGGTGTCTGTTTACAGAGGGTGAATGTGGGTGGGTCTTAAAGGGCCAAAGATGTGCTTACTGGG
GCCATATTTAAAGCAATTTGGGTGTGTAACATTTGATTTTAGTTCCAAATGAGCTTTGAGCTAATGGTCTTAGCTGTCTCTGAATAT
ACCCAAACAGATACAAAGCACCCTAAGATATTAATCCACTTATTTAAAGTCCATGCTTGGCCCATGTTGTTTAACTATCT
75 AAGTTGATGCTATTTATGAGTCTCAGTTGGGAGCCAGCATGAAGCATCTCAAGACCCAGAATGCTATAAGGCTACAAATTA

5 GGATTTTAAAGCCAGTTCTCAGCCAATCTGCCCACTTGGGCAGCCAGTAGAATAAATTGAAAGGAGACAATTTGTTTTGACCA
 GTCCGTTTAGTCAATAGAGTGGCATTATATCCCCCTTTGGTACATGACCCAGCTATCTGTAACCTTGGTGTATCTACGCACAT
 GCAGGAAGATAAATTTAGCAAGCACACAGCCCTGTGCCCTGTGACCCCTCCAGCAGCTGACCTAGGGCTATGCAGTTATCTCAC
 ACCATGGCCACTAAAGTACAGTGAATTCAGCAAGAGTTTCAGTCCCTGGGCTGTTTATCTAATTTCTGTGGGTAACTCTGCAA
 CATGGCTATGTTCTCTTAATGTGGTGTCTGTTCCACACATATGCTGTTCTACTGCCCTCAAAATAGTGATCTTAGGGAA
 GTTAGTACCATGAGGAAGCTATTGGAAGCTCATTGTGACATTTGGGGAGTCAATCTAGTGTGGTTTGGTGGCGAAAGTACTTG
 10 AGGGAGGGGGTCCACTGTTGAATAAAATTTCTACTGGAATTTTGCACCAATCCCAAGTGCAGGAAATATTCTTCAGGGTTGGATGA
 GGAGAAGATTGTGATAGGGAAGCCATCTGATTCCCTTACAGGACCTCCAGGCTCCCTCTGCTGCCCTGTATTCTCTGTGTTCCACTG
 AAGGGAAGTTACATGGCTTTGTGAAGTCCAGAAGTCCAGGTTGTGTTAATAGGAGCAGAAAAATGGTATAGTCAACCAAGCTTG
 TGTATCCACCTTGCATTGACACCTGGGTTAACTAAATTTGTGCTGGGCTCAGCCACCATTGTCTATACATTTATGTGAGATAA
 GCCTCTGGATAGGTTGTGAATGTCAATGGTTAGGGGAATCGGCTCATCTAAATAAGTGAGGTATATGATGCAGCGTTGCCAGGA
 AAGAAGTATTACACTATGTTTCTAAATCAGGTTGGCAGAAGCAACCCCTGCATTAGGTTAGATTACCATCTTATATGTTGCTG
 TGGCTAAGGCTATAGGCCAGTTTGGTGTAGTCGGCAATTCATGTTCTCTCTGCTGTGACTGTTGTGTTGTGCTGAGATTTC
 15 TGTGATTGCTCAATAAATAAGTATGATGTGTTCCCATGAGTGTGGGATAGGTTTTCAGGTTGTTATGAGGCTCAAGAGAA
 CGTTGTTAGTCTAGCCACACACCAAAATTAGATTCTGAATTATGAGGCACTCGCATATGAGTGAACAAAACAGGTAACCAAGTATT
 TTTTAAAAAATAGATATCAGCTGGGCACAGTGGCTCATGCTGAAATCCAGCACTTTGGGAGGCCGAGTGGGAGATCAGCAG
 GTCAGGAGTTCCAGACCCCTGGCCAATATGGGTGAACCCCTCTACTAAAAATACGAAAAAAGAGATTACCCGGGTG
 GTGGGATGCTCTGTAGTCCAGCTACTTGGGGCTGAGGAGGAGAACTCACTTGAACCCAGGAGGAGAGGTTTCAGTGAGCC
 GAGATCAGCTTACTGCACTCCAGCTGGGCGACAGATCCAGACTCTGTCTCAAAAAAAGATATCAATTTGTATCA
 20 AGGCATAGGTCCTTTTATGTTCCCTGTATTGCAACATTATTGTGTTTCAGTGGGGACCAAAAGCTTTATGACTCCATTTTATG
 CGGAACTTTTATAGGGAAGAGGTTGTATACCTTTAATAACCTCAGGAGTGGCCCTTGGGAGGTGGCAGTGTGACTACCAAT
 AAATTTCTCCCAAGTACTCATGGACATAAAGTGTCTACTGAGACACTGGAGACTACTAGAGGGGACGGGGAGGGAGCAAGGG
 TTGAAAAAACAATGTTGGGTACTATGCTCAATACCTGGGTGATGGGATCATTGTACCCCAACCTCAGCATCATGCAATATAC
 CAGGTAACAACTGCACATGTGCCCAATGAATCTAAATAAAGTTGAAAAAGAAATGACAAAGCATAAAAATGTTTAAATGAAG
 25 ATGAAAAATCTCTCCCAAGTATTGTTTATTACATGCTCTCTCATTATCGTTTATGTTCTCTGTAGGTTTGGAGTGTGTATGGATT
 TTTAGAGGCTCAGAAAAAGTAACTTTGGGCAACAACTGCCCTCAATAGTTTCTAAGTTTAAATACTGTGGTTTGGACAAA
 TTTCAATAGCTATAAGCAAAATAGTTATCAATGTGGGTGGAGAACTCCCATGCAACAGTAGTTAGATTCTCTCCCTGAGATCAA
 ATATGTTTCTGTGAAGACTGTCTGTGCTGTGACACCAGAGCTATGAGTTGTTCACTGTGGGTAGCCAGCATGCAATTGCTGTA
 GAGTTCACTTCCATTGAGTGTATGTAAACTTGCAGTTAGTATTAAGATTAGGTTAGGGAAGAAATCCCAAGCTGGTTGTTT
 30 GTGTGTGCTGTGTGTGTGATTTTTTTTTAAAGAAATGTCTTGGCCAGGTAATGTCATGTAGTATGCAATGCTTGAAGCCA
 ATAATTGTAAAGGTATACACTGTGGGTGTCGATTGCACTTATTATAATTCCAGGGATAAGAAAAAGCTATCATTTTATCTATGCAA
 TCCCGTAATGGCTTGTGGGTATTGTATCTGGATTATAGTATTAATAACCAACCAATCACAAGCATCTGGTTGTAAATATTGGTG
 CATACTATCTCTGGGCATTCTTAAACGAGGCTCAATAGATAGTGGCCATTGCTCCATTGTTTAAATGGCATGAGTTAATAAT
 35 AGTGGGTATCATCTGATGTGAAGGAAAAAGGCCACAGAGCTTAGAAGGCATCTATGAGTCACAAGTGAATTCACAACTCTGA
 CTTAGCTGGAAGGATGTTACTAAGTGGTAGTAGAGAGAGGAGAGAGTGTAACTCAGTCTGATGTCTGTGACTGACCCAGT
 GAAATGGGAGCATGGTTCCCTTTGTTCCAGTCTGACCTATGTTGGGTGTCCTGTGGTGTGTATGAGGCATGCTGTTCCATACA
 TACTCTGCCCAGCAGTAGGGTGTGGATTACCAGGGATAGGGTGATCCCAATCGAGGTATAATTGACATTGGTGAAGGTAGGAACT
 40 TTCTCAGGTAAGGAAAGGCGAGAACACAGCATAGGCATAAATGTTGGAGGTCATTGTCAGCCAGCAGTAGGGAATCTGATTGTCC
 TCTGGGAGTCACCAATGGTGTACCAGATACAAGGGTGTGTTGGTTCAATCTCCTGGGTGTCGGGAGCAGGTCAAGGTTTGTTC
 ATAGTGGCCTTAGTGGAGCAAGTATAGGCGAGAAAAATGAGGATGCTTCCCTCTCCAGATAGTGGTGGGTGTTTGTGATTGTA
 TGCTGGGTAATGAGCAGACTAAGACTGAGAATGCACCCAGAGTGAAGTGGTCCATGCCAGATCCTGTGAGGATTGAGAGGGAAAA
 AATTTGGCCAGGCTCTGGATTCTTATGAGGGAGAGGAAGAGGTGAAGAGGCCAAGTTCCCTTGTGTTGGGCGACTCACTTCAGGGC
 45 CCCCTGTTCTGTAATACTGGTAAATCATGTTGTGTCAGTGGGTACATACATTACCAGAGGTGTCAGCATCTCTGTGGTGTCT
 CCTCATTTGCTGTGAATTAATAATGTTGTCATTATGCCAGAGAGGTATGGATTAAATGTAAGCATGACTATGGGCAGTATTTTGG
 GCTACGGGAATGCTATTGTCTGCTGATGTTCTTCAATATCCCTTGTGTTTAAAGGCCAATGTTGTCATTCTGTGACACCTGCTAC
 TGTAGGACAGAGATAAATAGAAATCCAAGCAGTGTCTTGGTAATGCCTATGTTGAATCTCTTGTGGAGAGTGAAGT
 50 CTTGATCTGACTGGATAACTTTGTGTAACCTTTGTACTCCCAAGGCCATACAACTATTTTATCAGTTCTCTCAATAACATTAGCA
 GAGCTTGGTGCTTTCTGTGGGTAAAGCAAGAGTAAGCCTGTGTAGGAATTACTACATTGTTGTGGCATATGTAATAGTTCCTGCTG
 CTTGAGAGAGGGCCCAATAAAATGACTGGATTGCGAGCTCTGATATAGCCCTTCTCCTGTGCAAGTGGTCAAGCTCTAGAT
 TTTCTGGTCTATGTTGACGTTCCCTAACAGTCTCATGTAAATGTCTCTCTGCTGGGTCTATTCTCATTAAACAGTTGATTTCTAGTGT
 55 CTCTATGATGCCAAATGCCCTGACCTCTCTTATAGGGTGAAGGGTAGCTCTTACCAAGTCTGCTGTCTCCCTCTTTTCAA
 AGGATTAACCTACTTTGGTACTTTAGCTAGTTTGTGAGTTTCCAGGTTGTATTGTTGCTGTGAGCTGAGGTATGGTGTACAAAGAT
 GTGCAGAGTGGAGGCCAATGTGCTGATATTTTCCCCACATCTCCTTACCCCAATGTGTCAGCCTGTATGTTTCCAGCCTGATT
 TGTGCCAAGTCCCAACCAATAGCCTATTAGCCACTGACAGGAGTTGCCAAAAATGTGAACTTAGTAAATGTTTGTGGAAGGC
 60 CTTCTCTATTCTAGGGGTGTGACACAGCCTGGCCATTGGGCACCTTTGGCCCATCCCATATGGAAGTTGAGTATTGTAATA
 AGGGTAGTAGGCTGTGCTGCTTTATCTGACTCCCTTATACCTGTGCTCACTCCATTGGTAAAGAAAAACATTAAATTTCTTG
 TTATGAAAGTGTGGCCATACTCCCTCCATTCCCAATGAGCAAGAGCCAGGGGCATTTCAGGGGTTTGGCAAGTTAACTCAC
 TGACAGAGTATGTGGCCATTTCTCACACAGTAGTGACACTCCAGGAGGGCCAGGTGTAGTTCAATCTGTAGATACCATTTTCAT
 65 TTTAATAAAGAACTTCTGTTGTGATCCAATTTTATGGGCACTCTGTCCATTACCCAGGGCATAACAGGAATCTCGGTCATAG
 GGTAATTTTCTGCCCCACCAGGGCTTCAGTTTGTAAAGTGCCCCATATGCTGCCAGTGGGTGTCTGTCTAGTGAATACTTTAG
 GCTGAGGCTGAGAGCTACTTACACCAAAAGCCATGGGTAGGCATTACCTGTCCATTGTTCCAGAGGCTCCAGGAAGCAAAAT
 GGGAGCAGTGGAACTTATAATTGCAAGTCTTGTCTTGGGAGCACTAGAGGGAGAGCCAAAGTATTAGCCTCTTTAGCTCAACC
 AGTGACTGTAGATGTTCCAGTCCCTACTGAAAAAAGGAAGCTTTACAGGTGTCTCGATAGACAATTACGCAAGGGTCAGCAAAAT
 70 TGGAGGTGAGGAAGGCATTGTGCTATAATTCTAATGAATGTTGGGGGTTCTTACTGATGTGAGCGGTTTAAAGCATGAGGAGCTT
 GTCTTTTATCAGATTGGAATAGTCTGAACATACTTCTGCTGTCAAGTGTAGAGATCTTATCTAGATTAGACTGCCCTT
 AGGAATCGGCTCAGATAATGGGCCAGGCTTGTGGTGTGCTGTTGATGAGAAAAACAGCAAGGTATTGAGGATCAGATGGAACTGC
 ATGCTGCTTACCGACCGCAAGTCTGGAAAGGTGACCGAGTGTGGATCAAGACTGAAACATAGCCCTTTGCATGCACGGTGGG
 AAGGACCCAGCCCATCATCTGACCACTCTCACTGCTGTGAAGGTAGAAGGAATCCCGGCTGGATCCACCTCAGCAGTGTAAAA
 75 CCTGCAGCGCTGAAACTTAGGAGGCAAGCAAGACCGGATACTCAGGCCGTGCTCCGCTGTCAGATAGTAAATCCAGCTGTA
 TGTACCTGCTGTGACGAGATCTAGGCTTTCTTCTGGACACCTTATACCCACAGTCTCCAGGTGCCAAGTAGGGCATCCGTTCC
 CTTGGCAAAACCGCATGCTGTGGGTGTCTAGCAGAAGTCTCTGACGTAAGTGGAGCAACCGCACCTGGGTCTCTGGCAGGAA
 ACTTCTGGAAGTCCGAACCAATGTTCTCGAAGAGATGGTGGGGAGTTCTTGAACCTTTGGGGAAGCGGGGTTCAACTGTACT
 GAGTGGTGACACCCGACCCAGATCTTCCACTGAAAGGCAACAGTTTCTGGCTCTCAGGGGCTAGTCTGATGCTAAAGAAAGAG
 TCTTTCAAGTCCAGCAGGTGAACAGCTGTCTCAGCTGACAGCAACCTTAAACATGTACAGTTAGGCACTGTTGGATGTAA
 CTCACTGTAGCTTGATTAACCAAGCACAAGTCTGTACTGGCTGTAGTCTTGGTCTTGGCTTGGGAACAGGCAGGAGGAAAGT

342

ACCTCTACTCTCATCTCCACCTGGACCAGACAGAGAAAACAACTTCTTGAGTTTTCAGAAAACCTACCAAACTCTGGCTCTAGCTCCG
 CATCTTGGCCAGAGCATGGAAGGTGGGGTGGGGACACGGTGAACAAAACTGCATCTCGAGCTGCTCGCACTTCTCTTTCC
 CTCTTTGGTCTTGTTGTGGGGTACAGAGGTACCAGGCAGGGGTCACTAAGGTTGTAGTGGGAGGATGTGAGCCCTAGTGGGTTT
 CTCCAGGCAGCTCAACATGGGAGGCTCCCAATTCCTCTCTCTGCAAGGAAGATACCACAGCTGTGTCTTCTCTTCAGAG
 5 ACTGCAGATTGGAGGTCTGTTTTCACAAAACCTAGTTCTAAGACATTTCTAGCAAGTGAGAGTGACTGATTGGAGTCTAGTGG
 TGACAGCTACCCATGGGGCAGGCTTAAATAGCGACTCCTCTTGTAGTGAACGAATTTAGATTTACACAAAGAGGGCAAAACCA
 TGGGCTATTTTCTCCATGAATTTTGCTATTTTGGGCCCTAAATCAAATTGAGAAAAGTGTGACTAAAACACTCAAACCTGCCAA
 TATAGTTAGAGATATACACTTTGTGAGACTAACTCGGGAATCTACTGCCCTGCTTCTGCAAGGATAAGGCTCTGTAAAGGCATGACT
 TGAATGAAATCCAAGCACCTTTTATCTGTTTAACTCTGGTGACGAGAACAGAGCAGCATTTAAGGTATAAATTAATTAAGTCTA
 10 TTCTGAAGAGAACTTTGCTACTCACATTTATGTTGGAAGATGCAATCTCACAAACAAACAAAGCTCTCTTGTGAGTGGAGCAG
 GCCAATCTGGGTAGGGCTAGACTATAGGGCTCACAGGCTCTATGCCCTAAGCTACTGATGCCCTTTGTGCGAGGGCTGGGTTT
 TGCAACAACTCAGTTCAGGTCTGGGAACACTGGGCCACCGAGAATCTAAATAGTCAACTAAAATCCCTGAAATACCCAGGCCCT
 GTTCTTAAATCATTAGTATTGTTTGATACCTTTAGGAGGTACAAGCGCAGTTTGTACATGGTTATATACCCACTGGTGAAG
 TGTAGGCTTACCAAGCAAAAACAGGGTGGTAGATAATCTCCCTTGTCGAATCAACAACTATAACCTGGCAGAGGGTGGGCTAC
 15 TATTCACTACTACAGAGAGCCTGGACTCCTCTAACCTGATAAAGGATATGAAGCCAGTTATCTATTATTACCTCTTAGCTCC
 AATTCACAGTCAATATATATTCTTCGATAATAGAGGGATTCTTAAAGCATCTCTCTTTAAAGTAGCATCAAGAGCAGCATGT
 TACACTACTTAATAGAGGGCTCTGGAGGACAGACATTGAAAAGGAAGGGTACTTCTATGATTTCTGGCTCTCAGAGGTGTGGA
 GGTAAAGACATTGAGGATGCTTTGTCCAGGCTGGGCCAGCAACTGTCCCTCAGTAAACCTGAGTCTGGTGTGGTGTGAT
 GATCAGCTTCTGTGGCCCTCTGTAGGGACATCTGTACTCCAAGTCATCTGCCACTGCTTCTCTGTCTCATTGTCTCCGCA
 20 GCCAC
 ACCGAGCCCCCACCCTGATCTGTGCAAGGGGCATTGTTTACTCCAGGCCCTCAAACCTGAGACAGGACTCCCAACCCCTACTTCACA
 CCACATACTAGGCACCGCTATGGCTTGTCCACACTACCATGCTCCAAAGGGTGCTTCTTGCTTCTCTGCGAACGCTAGACAGT
 TGTGCCCTCTGTAGACAGCTTAGGTACTGGCAAAACAGTGGAACTTCTTGCCATCCAGTAGGTTCTTCTCCAATAGGTATAAAA
 TCCATCTGTGGAGAGAAGCTTTCATTCTAAGCTTGTCTTCTTGGGTACTCTCTCCAGCCCCAGAAAACCCCACTAGAGTTGT
 25 CTGTATCTTATACAAGATCTTTTATCATCGCTTAATGATTCTTTATATTAAATTTTCCCTTCTAGATCACTGTGTGCTTTCTAT
 CTCTGATTGGATCATATTGCTGCAAGACACAACTCTACAGCAAGCATCATTCTTAATGGAGAATCACTGAAAGCTTTCTCTCT
 AAGAGCTACATCAAGTAAGGATATCCACTTACCACCTCTATGCAATAGTTTACTGGGGGTAGGGGCGGGGCTCCAGGACGCA
 GTAGGGCAAGAAAAGGAATAAGATATTGGAAGGAAGAAAGAGCTGGAACATTTTCAGATGATATGACAGTGTATATAAAA
 TTCTACAAGATTATACAGACAAATATTAGAATCGATAGAAGAGTTTATATGCTTATAGGATAAAATCTTAAGCAACAAAGCCAA
 30 TTGTATGCTATTAGAGCTATAAATTTAGACAATAAAAATTTCAAACATATGATTGCAAAAATTAATAAGTCTAGGATAAAAAG
 TTGCTTGTGGGAAAAATATAAAATAATTTTGGGCAAAATTAAGGTGATCTTATTAACAGAAAGATAGACCATAACACGAATC
 GAACATTCAATATTGAGAAGTCAAAATCTAAAATATCAGCACAATTCAAATTAGAACCCCAAACTAGCTGTGTGGTTGAAGTTTAC
 GATTAGTTTATAATTTAAATGGAATTGAAATGGACAAAGTAGCCAAAGACACTTTGAAGAGCAAGGTAGAATTGATTGCTTAA
 TCCAAATATCAGAAATTGACTATGGATCTGTAGTAATTAAGACAGTGTGGTATTTCAAACAGACAAAGTGCTTATAGAGATATAGA
 35 ACTAGCCACATATGTGTAGATACTTGATTATGGCACTGTAATCAACTGGCAAAAGGCAGACTTTCAATAAGTGGTTCACTGA
 GAAAACCTGGATATTCACTTACTTACATACATATATACATAAATGGAACCTACTTAAACAATACACAAACATCAATTGCAAGGTGG
 ATTAAGACCTGACTATGAAGGCAATAGCAGACATATTTAGAAGAAAATATAGAGAATGCTTTCATGGTCCAGGGTCTCTTAAAAA
 CAGAAAAGATTTCTTAAACAAAAAGCACTAACCATCAGGAAAAGATATGAAATGACTATATTATAATTAATAGCTTCTGTT
 CACAAACCGGAGCAGAAAGCAAGTGAATATACAAACAGAGCAAGGGAGTATTTTGGCCGAGGTGTGGAAGAGTATTTAAATATT
 40 TAACAGCTACTTAAGTCAGTATCAGATGAACATAAAATTAAGAACCGTGGGTAAAGAGGTAAATTTGAATAGGCCCTTCTCAAA
 ATAGAACTCCAAAGGCTCATTAAACAAAAATGTGCTAAAGCTTAATAGTAATTTGGATATGCCCACAGTAGACCGGCAAAA
 TTTAAATTCGGGCAATACTTGGTGTAGGTGAACATGTGGATCAGTAAGGACTCTCTATGCTGCTGGTGGGATTGACAACTCTCCCA
 ATCATACAGAGCAAAATTTGGCATCTCTAGTAAAGCTGAGGATATCCATTCCCTATGGCCCTGTGATTCTATTGATATAT
 ACCCTAGAGAGATTTTACACGTGTCCCATTAGAAATGTGCAAGAATGTTCAATAATCATTGAAAAGTAGAAGCAATCTTAATC
 45 TCCATCTGCTGTAGAAATGGAGTGAATAATCATACATAATCACTTTGCTATAAGCATATGCTGGAAGACAGTCCATGGAGACAA
 AAGCATGCCGTATGATTCCACTTATACAACTTCTATCAACTCTATTGTTTAGGGATGCGTACAAAAGTGATAAGCTATAAAGGA
 AAGCAGTGAAATGATTATTACAAAGTCGAGCAATTAATATCTATATAGGAGAGTGTGGTTGTGACTGGAAGAGTACAGCAG
 CTGTATTCTGGAGGTTGGCAGTGGTCTATTGCTTGACCTTGGTCTGGTTAAGTAGGTGCTGCTTTGTAAAATAATCTAACT
 50 ATACAGATACGTTATATGCACTCTCTAATTTGAAAGTGCTTCTCCAGAAAAGTAATAGAAAAGATGATGTTGTTGGA
 GTAGAAATTTGATGAGGTTGCAATAGTTATGGTTGAAAACCTTGATTTCAGAGACCAAGTGTCCACTGTTATTAAAGAGGGG
 GAGAGAGCTGGAGTATTAAACCAACAGGTTACACCCCCCACCACCACCACCAATCTGTTCTACTCTAAGCCTTCTCATC
 TCCAGATTTTCAACCTATATTGTTGTCATTTCCAACTCATTCTGTGACAGACAAATTTGGAGGATTGTCGTCTTAATAAGGAC
 55 ATTAGGCACCAAGGCCAGCAAGACTGGGCCACCACTTAAATGTGAGCAGGTACACCGGGCGAGTGACAAGATCGTCTGTG
 CACATTACTTGGCAGAGTCCATTGAGTACTGAGGGTTTAACTTAAACATTTAACTGGAACCTCTGCCAGAGAATGTGCTGGA
 GAATGCAAGATAAACTGAGCAATGCCCTCATTGTGCTATGAGAGTGGACATGAAGTTTATCATGGTACAAACCATCGTGAAGGGC
 AAAGAGTTGGTTTGGTTGTGCACTGTATAGGGAGAAGCCAGGGGCGGGTGGGTTTTTTCCAGATTTCAATATAAATGTTTCA
 TCCTCCAGACTTTGCAATTTGATAGGCTGAAGAGTGCTAATCTGTTTGGCCGCTCTCTCACTCATTCTAATCTCTGTTATCAGCAG
 60 ACAAATTTGAATATGTGGCAAAATGACCGAGCACTTGTCTCAAGACAATTTGTAGTATGGAAGTTGTCCGCGCAGAGGTGGG
 AAGGGGAAGGGCAATTTCCGAGAAATGCCAGCACTATGTTGTTTAAATGTGACACAGAGACAGTTTCTCTCAGGAATTTGTC
 TTTCTCATCAATCCAGCCAGGTAGCCAGCCTAAACAAATTTTAAACACAAAAAGTATGAAGCAACATGCTTAACACTGGGA
 GGGGCTGGCGTGTGTTATTGGGTATATACAATGAGTCAAGGATTAATTTGCTTTTACCAGATAGATACCTAGGTGTTCCACAG
 CATTATTGAACAAGATGTGCTCATTTCCTCACTTCTCAGAGACCTCTTAATTAATTTATTAATTTATGATATATATGATGCA
 65 TACCAGGCTCTACCTCTGGGCTTCTATTCCGTTCCAGAGACCCAGTACCAGAATTTAAATCACTGTGGCGTTGAATACATTTT
 AATATCTGATAGGGCCAGTTTCTGCGCATTCACATTTTTTTTCCCTTTTCCAGAACGTTGTTACGGCCCGCGGAGGGGGCGGGA
 TCGCGCTCTCTCGGCTCTGTTTCCAGCCGAGCTCTCGGACGACAGAGATGGAATCCCGAAGCTGCTGACCGGCTCGCGGGGCA
 CTACAGGGCGGCGGCGGCGGCGGTATCCCGCGGGTGGCGGCGGAGTCCACCGAGGCCCTGACTCGCGGCTGGCCAGGTCCCCAC
 GCGCGCGCTCTGCTGCCCGGGGCCCCAAGATGGCGGGGCGGGGCGGCGGAGGAGGCGGACCGGCATCACGGGGCCCTG
 70 CCCCAGCCCTGTTTCGCGCGGAGGCCCATCAACCTAGCGGCGGCGGCGGAGCACTTCTCTGCTGCTGCTGCTGACCGGGGCT
 GACGTGGAGACCGGGGCTCGGTCAGGCGCGGCGGCTGTTGAGGGAGGAGGCAAGGCGGGGCGGGGCTCCAGGGGACGA
 GAGCGGCGGCAACCCCGGGGCTGCTCTGCGCAGGGGCCCCACTGCTGTCGCGGTTCCCACTCCGGGCCCCGATCTCCGCCCCG
 GCGCCCGCGGCGCTTCGCGGCGCAGTCACTATCCAAACAGGACCTGCTGTTGCGCTTTGAGAAGCGGCTCTCAACCTGGGCG
 75 AGCAGGAGGCGGAGGGCTGGCGCGGCGCTGGGCCCCCGGAGTCTGCGGCTCTGGTCCAGGCGTGGTGTCTACCTGTGCCCC

5 GAGGCGCTGTGCGGGCAAACCTTCGCCAAGAAGCACCAGCTGAAGATGCACCTGCTGACGCACAGCAGCAGCCAGGGCCAGAGGCC
 CTTCAAATGCCCCCTGGGTGGCTGCGGCTGGACCTTCACCACCTCTTACAAAGCTCAAGAGGCACCTGCGAGTCGCACGATAAACTGC
 GGGCTTCGCGCTGCCCTGCGGAGGGCTGTGGCAAGAGCTTACCACCGTGTACAACTCAAGGCGCACATGAAGGGCCATGAGCAG
 GAGAAGCTCGTTCAAATGTGAGGTGTGCGAGGAGAGCTTCCCCACGCAAGGCCAACTCGGCGCCACCAGCGCAGCCACTTCGAACC
 CGAGAGGCCCTTACCAGTGCAGCTTTCTGGCTGCAAGAAGACATTTATCAGTGAAGTGTCTGTTTCCCATAAACCGCGCCCATTT
 TCAGGGAACAGGAAGCTTTTCTGCTCTTTCCCTGGCTGCAGCAAGCAATATGACAAGGCTTGTAGGCTGAAAATTACCTGCGG
 AGTCACACCGCGGAGAGACCTTTCTTTGTGACTTTGATGGCTGTGGCTGGAACCTTACCAGCATGTCCAACTCTTAAAGGCACAA
 AAGGAAGCACGATGACCGAGGTTCTGTGCCCTGTGGAAGGCTGTGGGAAATCTTTCAGAGGGCCGAACATCTGAAAGGCC
 ACAGCATTACCCACCTGGGCACAAAGCCTTTCTGTGTCTGTGGCAGGCTGTGTGCCAGGTTCTCTGCTCGCAGTAGCCTCTAC
 10 ATTCACTCCAAAGAACACCTGCAGGATGTGGACACTTGGAAAAGCCGTTGCCCGATCTCCTCTTGTAAATAAATCTTCACATCCAA
 GCACAGCATGAAGACGCACATGTTAAAGGCATAAGGTGGGCCAGGATCTCTAGCTCAGCTAGAAGCAGAAATCTCTCACAC
 CCAGCAGTGAATTTACCAGCCAGAGACAGAATGATCTCAGTGTGACAGATAGTGTCTCTCTCTCTGTATGTACCTGACAGTACT
 TCTGCTGCATTGTGACACAGCATTTGGTGAATCTTGAATCTTGAATTTGATGTGGCTTCTGTGAGCTCGACTCTGGCAGGGCA
 CTTCCCTGCTAATAATAATAATTCGTAAGGCGAGGCTGTGGACCTCCGTCCTTGTATGGCCACCAGCGACCCCTCTCAAAGTCTGG
 15 ATACCTCTCTCTTTTGGAAACGGCGCCACTGGTTTTCAGCAGAGCTCCTTAAATATGGATGAGGTCTCAAGTGTAAAGTGTGGG
 CCATTGGGATCTCTGACTCTTTGGCCATGAAAACTCCAGTCAGAGCCCTCAGGCTTTGACACCAGCAGTAGCTAAGCTAAGCAGTGA
 CACAGATACTCTGACTCCTTCGAGCACCCCTTTGTGAAAACAGTGTCTCAGAACTACTGACACCAACCAAGCGGAGTGAACGTAC
 ATCCTAATCTGACTCTTCTTGGACAGGAGGAGAAACCCAGTTTGGATTCCCAATGCAGCAGGAAACCATGGTCTCAGAAAGAA
 AGAAATCTTATCACTGTGACTGGCAGCTCATTTTGGTATGAAGCAACTCTATTCTTCTTGCATGTGGCTAATCTTTATTACA
 20 GTCAATTTTGGAGTATTTCTGGACTAAATATTTAAGTGCAGTCAATTTCTTTTGGTTTGGAAAAAGAGCAGCCCTGGACTATGA
 GTTTGGAGATCTAAATCTGATCTTGAGTCTGGAATGACAAGTTGTGTGACCTCAGCAAGTCACTTAACTATCTGAGCCTTAA
 TTTCTTATTTATAAATGTGGTGGTTTGAACACATTGCTCATAAGGTCTTTTCAGTTTGTGTTTGTGTTTGTGTTTGTGATTGTTG
 CTTTTCTTGAATAATTTTCGGCATTTTGAATTTATTTGTTGTACTGTAAATCAGAAGCGGTTTGGCCCTGTAGCTAATAAT
 AATGAAAGATTGAGGAAGTGGTGTATTAATAAATTTAATGGAATTTACACAGTACGAAAAATCTAATGATGAGTGAAGTATGTTTGTG
 25 AAAAGAGCTAAAAATAGGAGTGGTCTTCTTAGCTGTTTATCCTTCAACCTTTTAAAAATGATGAAGGTATGTTTGTGTTG
 TGGAAAAATCAAGGGCTTTGTTATCACTCAGACCCAGAGTGAATGTTGCTTTGTGGTTTGAATAAGTTGGCCCTTTAATAAGT
 TATTTAGTCTCTCTTAGCTCAGTTTCTATCTGTAATGTGTCATAGCAATGTGAACATATGTGTACATCTAGACTTATTTT
 CTACCCAGTAGGTTGTATTGAAAGGAAATGTTATATGTGTTTTCAGCATGTTTGGTGAATCTTCATTCCCTTCTGCCCCCTG
 30 TTTTCCCTCTCAAAGGGGAGAAATTAGCACAAATAGTATCAGGATTGTGCAGGAAATAAACATTGTGAAGGTTAAGAAAGAGG
 AAAAGGAAGTTATTTCTCAACAGATTAAAGATTCTTCTACACACAGTTCTTTGTGGCATTGGCCACATGTCATTAGACCAAT
 TGATAGTATCTCGGTCTGATTCAAAGCCAGCTCATGCAATGAGTATCAGCCTATTCTTCCAAGACAACTCGACATAGACCAG
 AGGAGATTTTCTCCCTCTGTGCCCTAGAGAGCTCATGTGGCTTACTCTTAGAGTTGAAATGAGAGGGTTTTG

HUMAN SEQUENCE - mRNA
 35 CTGCTCGCGGCCGCCACCGCCGGGCCCCGGCTCCCTGGCTCCCTCCTGCTCGAGAAAGGCGAGGCTTCTCAGAGGCTTGGCG
 GGAAAAAAGAACGGAGGGAGGATCGCGCTGAGTATAAAGCCGGTTTTCGGGGCTTATCTAACTCGCTGTAGTAATTCAGCGA
 GAGGCAGGGGAGCGAGCGGCGCGGCTAGGCTGGAAGAGCCGGCGAGCAGAGCTGCGCTGCGGGGCTCTGGGAAGGGAGAT
 CCGGAGCGAATAGGGGGCTTCGCTCTGCGCCAGCCCTCCGCTTGTATCCCCAGGCCAGCGGTCCGCAACCTTTCGCCATCCAC
 40 GAACTTTGCCCATAGCAGCGGGCGGGCACTTTGCACTGGAATTAACAACCCGAGCAGGACGCGACTCTCCGACGCGGGGAG
 GCTATTGTGCCCATTTGGGACACTTCCCGCCGCTGCCAGGACCCGCTTCTGAAAGGCTCTCTTGCAGCTGTGATGACGCTG
 GATTTTTTTCGGGTAGTGGAAAACAGCAGCCTCCCGCGACGATGCCCCCTCAACGTTAGCTTACCACAGGAAGTATGACCTCGA
 CTACGACTCGGTGACCGCTATTTCTACTGCGACGAGGAGGAACTTCTACAGCAGCAGCAGCAGAGCTGACGCCCCCGG
 CGCCGAGCGAGGATATCTGGAAGAAATCGAGCTGCTGCCACCCCGCTGTCCTTACCGCGCTGCTGCTGCTGCTGCTGCTG
 45 TCCTACGTTGCGGTACACCCCTTCTCCCTTCGGGGAGACAACGAGCGGCTGGCGGGAGCTTCTCCACGGCCGACAGCTGGAGAT
 GGTGACCGAGCTGCTGGGAGGAGACATGTTGAACAGAGTTTCTATGCGACCCGAGCAGCAGAGACCTTCTCAAAAACATCATCA
 TCCAGGACTGTATGTGAGCGGCTTCTCGGCCGCCCAAGCTCGTCTCAGAGAAGCTGCGCTCTACAGGCTCGCGCCGCAAGAC
 AGCGCAGCGCAACCCCGCGCGGCCACAGCGTCTGCTCCACTCCAGCTTGTACCTGCGAGGATCTGAGCGCCGCGCTCAGA
 GTGCATCGACCCCTCGGTGGTCTTCCCTTACCCTCTCAACGACAGCAGCTCGCCCAAGTCTCTGCGCTCGCAAGACTCCAGCGCT
 TCTCTCCGCTCCGATTTCTCTGCTCTCTCGACGGAGTCTCCCGCAGGGCAGCCCGAGCCCTGGTGTCTCATGAGGAGACA
 50 CCGCCCAACAGCAGCAGGACTCTGAGGAGGAACAAGAAGTGAAGGAGGAAATCGATGTTGTTTCTGTGGAAAGAGGCGAGGCTCC
 TGGCAAAAGGTGAGAGTCTGGATCACCTTCTGCTGGAGGCCACAGCAAACTCTCAAGCCCACTGGTCTCTCAAGAGGTGCCACG
 TCTCCACACATCAGCACAACTACGCGCGCTCCCTCCACTCGGAAGGACTATCTGTGTCGAAGAGGGTCAAGTTGGACAGTGTG
 AGAGTCTCTGAGACAGATCAGCAACAACCGAAATGCAACAGCCCGCTTCTCGGACACCGAGGAGAATGTCAAGAGGCGCAACAC
 CAACGCTCTGGAGCGCCAGAGGAGGAACGAGCTAAAACGGAGCTTTTGTCCCTGCGTGACAGATCCCGAGTTGGAAAACAATG
 55 AAAAGGCCCTCAAGGTAGTTATCTTAAAAAAGCCAGCATACATCTGTCCGTCGAAGCAGAGGAGCAAAAGCTCATTTCTGAA
 GAGGACTTGTTCGGGAAACGACGAGAACAGTTGAAACACAACTTGAACAGCTACGGAATCTTGTGCGTAAGGAAAGTAAGGAA
 AACGATTCTTCTAACAGAAATGCTCTGAGCAATCACCTATGAATCTGTTTCAAATGCATGATCAAATGCAACCTCACAACCTTGG
 CTGAGTCTTGAGACTGAAGATTTAGCCATAATGTAAGTGCCTCAAATTGGAATTTGGGCATAAAGAACTTTTTATGCTTACC
 60 ATCTTTTTTTTTCTTTAACAGATTGTATTTAAGAAATGTTTTTAAAAAATTTTAA

HUMAN SEQUENCE - CODING
 ATGCCCTCAACGTTAGCTTACCAACAGGAAGTATGACCTCGACTACGACTCGGTGCAGCGGTATTTCTACTGCGACGAGGAGGA
 GAACCTTCTACAGCAGCAGCAGCAGAGCGAGCTGCAGCCCGCGCGCCAGCGAGGATATCTGGAAGAAATTCGAGCTGTCTGCCA
 CCCGCGCCCTGTCCCTAGCCGCGCTCCGGGCTCTGCTCGCCCTCTACGTTGCGGTACACCCCTTCTCCCTTCGGGGAGACAAC
 65 GACGCGGGTGGCGGGAGCTTCTCACGGCCGACAGCTGGAGATGGTGACCGAGCTGCTGGGAGGAGACATGGTGAACAGAGTTT
 CATCTGCGACCCGAGCAGAGACCTTCTCAAAAACATCATCATCCAGGACTGTATGTGGAGCGGCTTCTCGGCGCGCCGCGC
 TCGTCTCAGAGAAGCTGGCTCTACAGGCTGCGCGCAAGACAGCGGACGCCGAACCCCGCGCGGCCACAGCGTCTGCTCC
 ACCTCCAGCTTGTACCTGAGGATCTGAGCGCGCGCGCTCAGAGTGCATCGACCCCTCGGTGGTCTTCCCTTACCCTCTCAACGA
 CAGCAGCTGCGCCCAAGTCTGCGCTCGCAAGACTCCAGCGCTTCTCTCGTCTCTCGGATCTCTCTCTCTGACCGGAGTCTT
 70 CCGCGAGGCGAGCCCGAGCCCTGGTGTCTCATGAGGAGACACCGCCACCAGCAGCGACTCTGAGGAGGAACAAGAAGAT
 GAGGAAGAAATCGATGTTGTTTCTGTGGAAGAGGAGGCTCTGGAAGGTCAGAGTCTGGATCACCTTCTGCTGGAGGCCA
 CAGCAAACTCTCTCAGCCACTGGTCTCAAGAGGTGCCAGTCTCACACATCAGCACAACTACGACAGCGCTTCTCTCTCTC
 GGAAGGACTATCTGCTGCCAAGAGGTCAGTTGGACAGTGTGAGTCTGAGACAGATCAGCAACAACCGAAATGCACCGAGC
 CCCAGCTCTCGACACCGAGGAGATGTCAAGAGGCGAACAACAACCTCTGAGGCGCCAGAGGAGGAACTGAGTAAAAAGGAG
 75 CTTTTTTCGCTCGTGACAGATCCCGAGTTGGAACAATGAAAGGCCCCCAAGGTAGTTATCTTAAAAAGGCCACAGCAT

ACATCCTGTCCGTCCAAGCAGAGGAGCAAAAGCTCATTTCTGAAGAGGACTTGTGCGGAAACGACGAGAACAGTTGAAACACAAA
CTTGAACAGCTACGGAACTCTTGTGCGTAA

Table 14

MOUSE NOMENCLATURE

ICSGNM Bach2
 Celera mCG12764

HUMAN NOMENCLATURE

HGNC BACH2
 Celera hCG33075

MOUSE SEQUENCE - GENOMIC

GTGCGCTCAAGATAGAGACCAGCTACACAGCAAGTTCAGGTCGGTGTGGGCATGAAACACTGTCTCCAAAGCCACAGGAGACAAA
 GGGGGGGGGAACAACAGGTAAGGGTGACCATGTAATAAATTAATAAATCTCTGTGCTTTTAAAGAAGACCATTAAAGAAAGTAAAAAAG
 ACAAAACCTTATTTCATGAGATAAAATATGTGCAACTTGCATATCTAACAAAGGTTTAGTATCTAGGCTATATAAGTAATTTTGTAA
 TTCAACACTCTTAAAGCAATAACTCAATAACAAGCAAGAATTAATAAATTTTCCAGAAAATATGTACATGAAACGACACTCGAC
 ATCATTAAACATTAGAAAATATAGATTACAGTCATAATGAGATGTCACCTTACCCCAAGTGAAGATGAACGTCGGAAGACTACCCAC
 AATGCCCTGTGGGGGTGTGGAGACCTACTGATGGATTGTAAAGAGTACTATCATGGGAAGCGTTTGGAGCAGTTGTTCAAAATGT
 TAAAGAATCAGTGTATATCCAGTACACTAACCAAGGTTCTCCAGAGAAAATAGAAGGGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT
 AGAAAGACTCGAGAATAAACGAGAATAAATGTGTTTTGAGGACTGGTTCACATGTTTTATTGTGGAGGGCAATATTATCACTTGGGA
 CAGGATCTAGGATCATTGTGAGACAAGTCTATGGGTCTACCTGTGGGGATTGTATAGATTAGCTTAGCTTCTGGCCAGGCATGTG
 AAGGATTATCTTGATAGGTTTAAATGAGGTGGGAAGACTCACCCCAAGTATGGGCGGACACATTCCCTGGGCTTGGTGTCTCGGAC
 TGCATAAAGGACAGAGGGGGGGTGGCGGGGGGGCGGGGGGGGGAGTAATCTGCACACCAACAGTCACCACTTCTGTTTCCCACTT
 CAAATGCAGTATGGCCAGCTCAAACTACCATGACAGACTGGATCCTTGAACCTGTGAACCAAAATGAACCTTTGAGCCTTAGGTT
 GCTTAAAGGGCTCCATGT
 TTAATAACATTATTAGAGTGGCAGGCTAATTTTCTGGCGGTGTGATACATTGCACTAAGTGGTAGGAAGATTTTATCAGCAACA
 GGAAAGTGTGAGAAAATTAAGACAATATGGAAGCTAACAGTCTAACTCTGTTTAGACTCTAAAGGCAGACAGTCTGCTCTCC
 CTCAGAAAGGCTTCAGCCGATTGAATGAATCCCGCTGTATTCTAGACAGTAATTTGCTTTACTTAAAGACTACATTAGTAAATG
 CTAAGCCCATCTTGCTTCAAGAGCAGAAACCCCTAGTGTGGACTGAATAAGATTGCCTCACTCAGTGGTCAGAGTGAGCAGATGGC
 ATACTCCCAAGAAGCAACATAGGAAAGACTAATGATTTTTTTCTTTTAAAGAGCAGAAAATGTAAACTTAAATTCAGAGCCGG
 GCGTGGTGGCGCCAGCCCTTGTATCCAGCACTCGGGAGGCAGAGACAAGTGGATTCTGAGTTCGAGGCTCGGTCTACAAAGTGAG
 TTCCAGGACAGCCAGGACTATACAGAGAAACCTGTCTCGAAAAATAAAACAAAACAAAAGACCAAAAACCCCTTAAAT
 CAAAGGGGGGAGGGTGTACTATTGTTGTTGTTGTTGTTGTTGTTGTTTAAATTTGGTTTACGTTTTCAGTGTGTAAGTGGTG
 GAAAGAATCAATGTCTAGCAAAAAACAACAACAACAACAGGAAGTAAAGTTGGATCTAAGATGACTGTAGCGCTACAGAACAT
 CAGCTAGACCAACACAGCAGAGACTGACCAGAGGAGCGGTGTTCACAACACTGTCTAGCTAACTTGGTGCAGCCATGTTAAACAATA
 GGTATGACCAAGCCAGGTGGCGATGTCCCTAAAGCCAAACCAAGTCTGAGGCAACAGCACCAGAGGAAATCACCCCGAGATGC
 CCGGGGCTTGTAGTCCAGTGTCTGGGCGCTGGGAACAACATGAACCTCTAGTCTCTCTACAGATTTTAATCTGGAGTTCACAGATCA
 TAGAGGACCCCTAATAGACTTGAAAAGGTCCTTGAACCTTTGATTACCACATGGAGCAGTTTGTGTGTGTAAATTTTTTCCAAG
 GAAGGAGTCATCAGGTGTGAAAGGACCTTTGATAGGAGAAATGTTAAACATTATTAGAGTGGCAGGCTAATTTCTGGCCGTG
 TGATACATTGCACTAAGTGGTCTGGCACTCCCAAGTCTTGGACTAAAAATGAATCTTAGTGCATGATCTCACTGCTGCAGGGCA
 TTGTGATCTTCCCTTGGCATTTGATGGGACTTGTAGAGGATTCGGAAGGCAGGATGTTGGTACGTTTGGAGCCATTAAACCAAG
 AAGGAAGAAAATATATTGTGGAGTTGAATTAATGCTGAATGGCTAAGGACATTTTTATGGTCTTGTCAACACTCGGAAGGAA
 ACCCTGCTTAGAAAACAGTGAGTGACAAACAGCTCCGCTAGATGCAGCATGTTGGGTAACAAGTCGTTTCCAAGAAACGCC
 GCTTCAGTCACTGCTTTGATAGTGGAGACCGGGAGGGCTGGGATGCTGTGTCTGTGATTATAACTAGTATATGACCTAGAAAAGCA
 TCCAAAGGTCCTTTTCCATATGGAGACCAGAGTTCCTACAGCTCTGGTGTCAAAATGTGGAAAACAATGAAGGTTGTCTCTGGAG
 GCTCTGATCTATAGGAGAGATTCTATATAAATGAGGCACAGCCCTCAAAGTGCTCTCTCTCCAGGCCCTTGCTTTAAGTCTTAT
 TTTTGGTCTTGATCATTAAATCCCATTTACAGTAGATGGACAGTGGTGTGCTCAACCAGAAATGTACTTAAATGACCACTAAA
 CTGTTTATCTAAATGATGAAAATGGCCAATTATAAACTCTGGATACTTTATTATGACAAAAACATAGGATAATACAGAGTGGCGA
 CGGTCCACTTATCTTATGTGAGAAGATTTCTGTGAGGAGAACTAAGCGTTTCAAGATCTTGTGAGTGGCCAGTCTCAGCCAGAGAG
 ATCCTGAGGGCCCTGCGAGCCAGGGAAGAAGAGAAAAGGACAGGCCAATTTCTGTGTCAGTAGGAATAATGAGCCGTGAGAAA
 TCACAGATGATAAATAAGTAGAGACGAGGATGGGTAGATTGATGTGAGATGTAAGGTGAAGATAGAAGTACAGCCCTGTACTGAG
 GGCCTAGCCAGCAGTGTAGGAGCAAGATGGTTGTTGTTTCTGTCTGGAGCAGTGGGTCACGGTAGCATCTCTGTTGATCAT
 GCTGCTCATGCTCTTGTGTGGCCCCACAGGGTCAGCTCAGAACTTGTGAGTGTGGGATCCGGATGCTCAACTGTGTTGCTGTGATGG
 CACGAAGCAAGCCAGTCTGCAGATGAGACTGAGAGGCTGTGTGGCTCTCAAGAAAGGGTCAGAACTGTGCAGGATCTCTGTTGGCT
 TCTAGAAGAAAGATAGCAGAGGCTCTTAGAAGACTGCAAACTTAGGAGGAGGCAGAAAGATCTCTACAACCTTGACCAAGTACTGAA
 GCTAGGAGGAAGAGTTAAGGCATTGTGATGACCATCCAAGATCCAAGAAGAAACATTCTTCATGAAGTTGACAGAAGCCCTTAAG
 AGGTATGCTGCTTGCAGCCACAGTGAACCTTGTGCTGTGTGATATAGTATCCTTGAAGTCAGTGGGCACTAATACCCC
 GATGCCATTTGAGAACCGACTCTGCGGATGTTTTCTGGGTGGGCGTTGCCAGGGCTGATGATCCTCTCTAGAGGCTGGATTTCAGG
 ATGAGATTGCTATTATGGGTTTTCCCTGTGATACTCAGCAACCATGGACCATATGCTTACAGTTACTCCTCGAGGGAACTCTGACA
 AGATGATGATACTGCTTTTTCAAAAGAACTACAACAAGAGGGGAAGTGGGGGACACACCTCTAAGTTGTAATGTGCTTCACAAC
 CGATGAGCACTAACAACTAAGCAGTCGGCTTGTGTACAACTGCCATGGCATCTGTGCTTTGCCACCTTGCTTTGCTGTTTTAC
 TGAGTACACAGAAAAGTGAACACCATTTTTTGGAGAGGGGAACGTAATCTCTGACTGGTAGTGAATATCAGTGTGTGTGAGGAA
 AGAGGTGGCTGCTTCTTGGGTGAGCCTGGGTAGTCCCTTTGTCCAGCGGTGTGCCCTTAGGTAAGGCACCTTGTAGTGTCCGAGCC
 AAGGTTCTTTATCTCCAAGTGGGCTAATAACACTGAAAATCCCTAGCTCAGTCCCTAATAGAAGTTTTCAGTAAAGGAAAAATCA
 CGGTAGTACACAGACGCTGTACCCACAGACTGGTGTCTGTTAGTACAGAGTCAATGAAAGTCTAGGAATTAGTTCAGATTAGCT
 AGTTTTCACTCATTGTTTTTGGTTACTTCTCCTTTTCTTATAACTCTTTTTTCCAAATCGCTTGGTGACAAATAGTTCAGGTTGC
 AACCTCTTTTAGGATAGGATAGATAACATCTGAATTTTGTATATCTGGGAACATAAACACCGTCTTGGTGTGTAGACAGAGTGA
 ATTCAAGGCTCAGGAAGAGAAGGACCGATGGTCTGAGCACTGTATCCAGAACTGCATTCCAGCTACAGTTCCACAGACAGAAACA
 CTAGGTCCTTGCACCTGAAACATGTAAATGGCATCTCCCTAGGGTATGTCCTGTGTCAGTCTGTTGCTGTGTGTGTGTGTGTGT
 TCTGTGTGTATGTGTCTCTCTGTCTCTGTGTGTGTGTCAATCTTAATCACTTCTCCATCTTATTGAAGTGCCTTTATCTC
 TTCCCCCTTTTGTCTGTGATAGCACAGGGCATTCTCTGTGTGTGCTTTCCAGGGCAGTAGAAGACACAAGAGCCCCAAGAT
 TTGCGCCCAACATCTCAATCCACATATAAGTGGATGCTTAAATTTCTGTCTGAAAGATAAATTTTAAATTCATATTATAGAT
 TCCAAATTTAAATGCCAAGTGAACCATTAATCTGTTAAAGCTTTTCTGGCCACAAAATCGTGTCCACATTTAGTCTCTTGTGTAT
 GAGTAAGGACTTTAGAACCATGTGAGTAAATCTATAGCTAATATTTGGCAGAACATTGAACCTGATCTTGTCTTAGTAGCAAAAT
 AATCTCTAAATGTTTTTATTTTGAATGAACCTTTTGTTTCCGATCACTGTCCATTCTCTAGGCCTCAATCCAGAAGTGGGG

AATGCCCTGTGTAATGGGGATTGCTCTCAGTATTAGCCCTAAAAACAGTAAGCTGGTTTGGACAGAAGTGGTAGCCTGAACC
 TAGAAAACTCACCTTGACCTCTCTGTGCAGCATCTCTGTGCAGAAAACTGTTGCTGATTGTAGAGAGCATCCACCACCTTCAGGAG
 ATAACATTGATAAAGGAGAGAGAAGGAGAACTTTAATCCCACAGCCAAGGGGTGCCACCGTGCATGGTTGTAGCGTGCAATTCAG
 5 GGCTCAGCACAGACATGGACCGATGCTCTGAATACTTTATTTCTATCCTTTGTGTACCCACATCTCGGGAAGGTGGGAAGGAG
 CAATTAGGGAAGGAATTTAATCTCAGGAAGACACAGAGAATCAGTCTGGGAGTGAGAGGAGCCCTGAGCTACCTCTCTGTCTTG
 AAGAAGTGATTCTGCTCGTATGAGATCTATGTGTGGGTGAAAAATGCCCTCCACCTGCCGTCTCTCGGGGAAGTAGCTCATCACATC
 CTCTAAGCCCACTAAGACCGAGCTCAGCTAGGAGTTAAGCTGTGCGGGATAAAGAACGCAATCAGCCTTGCCCTATACAACTTTTCCA
 GAAAACCCAATCGTTTCGCAGCTAATTGGTACAAATGTTCCCTTGCCCGTGTTTACAGCTGGAGACCCCTCTTGAACATTTTATG
 10 TAATTAACACCACTTTACTCTTCTACCTTAAAAATGCAGGCTCTGCCGACTCTTCTTTAAGTAAATTTAAGATTACGCAAGAG
 GGAATATAGACAGATAATTTCCACATTTGCAGTACACTACTTTATTTGGAAATGAATGAATAGAAACCACTCACAGCTCTACTT
 CTGCAGTTCCCCCTGCTTCTTAAACAGTAACATATGAAGAAAGGAAAGGCGGTGTGTCTGCTTGGTGTAGCTGTATCCACAGCA
 CATCACCCACTGTTTCTGAGAACTGTCCACTGAGCCACTCTGTGTGTGGAGTCTTTGGAAATCAATCTTGTAGAAAAATGCAGTC
 GAGGCAGGAAGCGTCCAGCACTCCTGTATTACCCGTGTTTCTAAGAGGCCAGGAGTTCAGAGCGCTTACTGGCTGAATGGGGGTG
 15 ATATGTGCTATCCTGTGGGCCACTGGGCTGGAAGACCTCCAAAGAGCAGTGTCTATGGTGTGTGTTGCTTCCCTATCTCATGTTTA
 GCTATTAAATTTGACTTAACTTAAATCAATTTGCTCATTCTTAGCAGGTAGACTCTAGGTACTGGGTGCCACACTGAGGCTGCT
 GTGCTGTGCTGTGCTGTGCTGTGAATGCTGAGGTCCCATTTATCATAGAAACCTTAAATAGTGGCCCCAAGATTTTAAAGGATC
 CCTTGTGACTATAGCATATAGTTAAACAAAAATCCTATTACCAACCTGCTTGAGACTAGTGGTCAAATAGCAATCAGATTGGCTA
 GCAAGACACCATGCAGCAGTATGAATTTGTTGACTATACCAATGCTGTAATTAATGAAGCACCAGAGTTAAGCAGAGTCTCGGTG
 20 TCTAAGCTCTTCACTATCTGCTGAGGCTATTTCCCTAAGGTTCTCGGGCCCTTCTTCAGTCACTGTAAGTGAGGAAGCCAATGAC
 CTGGAGGCTCACAACACTGCAGGCCAGATTGGTGGCTGGTCTTAGGTGTCTAGGTGCTTGCCTTGACTTTGAGAAGGGGACACTTTCT
 AAGGCTCATTCTGTAGGCTCAGATACCACTGTCTAGGCCATGACCCAAATGACAGAATCATCAGTTCACCAAGACCTCAGACATC
 ATCATCTCATGACCCAGAGAGTCACTCAGCTAGTTTGTGACCACTGAGAAATACAACACTTAGTCTGGTATTTATTTACTCACT
 CATCTATGGCTACCTCTTCTGTGCTACTGTAAATGGGGATTATTAACCTTAATGCCTGGCAACATTTGTTAATAAAGCAAG
 25 ATGTTTCTCAACCTTAAATGTATGCTTATAATTTGAAAAATCCCCCAAAATCCCCACATATTACATATTTACATATGATCATATT
 TTTTCCACCTCATTTAATCCTAAGAAGAACCTGTGTGAAGAGTTAGGCTCAGAGGCAGAGCACCTGTCCACATAAGGAAGCCACT
 GTGACAGCAGGGCTGTGCTCTCCGGACTTAGGAACAATACTCTTGTAAATGTACGGCAATACAAGCATGTGGCATTGCTGCTG
 TTTGGGCTGTGGCATTGTGCACTCAGGAGTTAGCGATGTTGGAAGTTATGGCTTTGCTCGAGTGGTGCATTTTCTTTTATAC
 ACTTTGATAATCTGCCAGTTGACAGACTTTGGTTCGGCATGGGCGCTTTGAAGTATATTTTAAAAATGAGAGAATCCAGATTG
 30 TAAATAGCTTTGCAAATGCTAGTTGTACAGTTTCAGCATCCGAGGAGCTCTGCTAATGTCCCTGTTCTAGTGGCAGCTCTGTGT
 GATTTTCTTTTATTTCCCTCTCCGTCCCCAAGCAATTAGGAGAAACAAAGTCTGCTCTCTGAGGATCACTTCTCCTCCTTCACT
 TTGTATAAACTATGAGCTTGGTGACCTCACCGAATTAACGATATACCTGATTGCAACAAAGGACAAACCTTTTAAAGCCACTTAC
 CCTCTTAGGCTCCTAATCAGGACANNN
 35 NNN
 NNN
 NNN
 NNN
 NNN
 40 NNN
 NNN
 NNN
 NNN
 NNN
 45 NNN
 NNN
 NNN
 NNN
 NNN
 50 NNN
 NNN
 NNN
 NNN
 NNN
 55 NNN
 NNN
 NNN
 NNN
 NNN
 60 NNN
 NNN
 NNN
 NNN
 NNN
 65 NNN
 NNN
 NNN
 NNN
 NNN
 70 NNN
 NNN
 NNN
 NNN
 NNN
 75 NNN
 NNN
 NNN
 NNN
 NNN
 TCCCTTATCCTCAGAGAAGGAGAGCTCCCTTGGGTGCCCTATCCTGGGACATCTATTCCAGCAGGACAGGCACATCCCTCCT

349

TAAGTGTCTGATAATATGCCAGGAGTGAAGCGATTCTGTGTTAGGTCATCTTTAATTATGCATGTACCACCTGTGAGCTCTAAATC
AGGATCAGATCAGATCCTTGCGAGTCACTTTGGGGAGGGTCGGAGAGAAGCCAAGGTGATCTCTTTGAGAAACACAGAAATAGC
AGTAAACATTTCTCATCCTGAAAGCGCTCGGGGGCATGGCTCATGAGGCACCAGCCACTGGCACATCTGAGAAAATCCGAAAT
5 CTCACCAAGCAAGATAAATTACCTCGGAGACAAATTACGGAGAGCTTGAAGTGCCCCCTCCCTCCCTCCCTCCCGCCCGC
CATCTGTGGCCTCTCTTTTATTCTTTCTCATCTTTGTAAGGAGCCAGGGAGAAAGCTCAGACACATTTTATAAGCTACGTGAG
GACAGGAAATATGATAATGATGTAGATTTTCATACATTTGGGGGATTTTTTTTTCAGTAGTTAGTTGGCTTTTTTTAGAAGGACAA
ATGTGGGTTGGAAGAAATGCTTGCTACCCTCTGTGAGCTTTTAGTAGTTTAGTCTCACTTTTCAGGGCTGTTTGGGACTTTCTGG
10 AGGGATGTTTAGGGTCTTTTACCAGAAAGTTCTGTTCCCTCCACTAAGAGGTGTTTTTCTCTGTTCACTGTGAGAGGCTTAAAGGC
AGAGTGAACACACGTTCACTCTTTCATATAACAGGTGGGCTTGACTGACTGCAGAGGGGCAGGCAGAGAAGGGGCAGGCGGAGAAG
GGGAGGCGCAGGGAATGACTGAACATGCTTTATCCCATGTTGCGAGCTCTCAGAACACAAAGGGGAGGCTCCAAGGCTGACGCTTC
TCCAAGCTGGGGGGTGGGGGGAACGCTCCTGAGATGGCTTTGGCTTTGACCACTTTTGGAAATCTGTAATTTCTCTATGTGTC
ATCCAGCTGAATAGAGGGACAGGACCGCCATAAAAGTGGACCTCCAGCCCCACAGAGCATTTGGGTTATGACTCTGAATCCCTCTTC
ACCACCATCCAGTGCCTAAGGTGACGTTTACTGCACTGGGCTGCATCCAGGTAGCACAGAGTAGGCTGACACTCACTCTCCGGT
15 CCAGCGTTTGTCACTTAGTGTGCAATTGCAAGTAAGTAAAGTTACACAGGACTGTGAGCTCCACACAGCGCAGACTTCTCTCAGAAG
TGACTGCAACGTGCCATGCCCCGACAGAAGAAGATCCCAAAGTTAAGTCCAGGAGAACCAGAGAACGAACCAAGTAAAGCA
GTGCCACCATATTTCTCATCCCGCTCGTCTTTGCCAAACCTTTCCATCTGCTGGGAAGATTTGTGTGCTCTCCACCTCGCT
GACTCCTATTTGAATGTTATCTCTCTAAGAAGCATCTTAAATTTATTTTATAATTTTATACATGTATATAGTGTCTTTTG
CTCAACTGCCCTCCCTCCAGTTAACTCTTTAATGCTTTCTCCCATCACCAAATCCCTTCTTCTCCCTAGGCCCCCTCCCTG
20 CTTTCATGCTTTGTGTGCTGTAAGACGCACTGCATTTAATTAGAGGTGAACATGAGTGAGGTCATTGCTTGCAAGAGCAGT
GTGCCAGGCTCATTCACAGAGGAATATGATTGCCATCTCTGTATCTTTAGCTTATTACATCTCTTTGAGAGTGGCGAGGCT
TATGAGCTCTCTCGGATCCATGATGGAGAATACTGTGGGGCCAGCTCTACGAGGGCAGCCACTGCTTTGAGTCCATAGG
TGCGATGGCCATGTCCTGTCCCCTAGACAAACCTATAGTACTCTTGGCATCTTCCAACCTTACTTTCTTTCTGCTTCTCTTTC
TTGGCATCTCTGGGCTTCAGAGGGATTGATACACATCTCCCACTTAGCTGAACATTCACAAATCACTCGTTCTCAGCACATTCAG
25 CAGTATGGGTCCTCGGTTAAGTGTACCCATGTGAATAGAACTTCTCTGAACAGGCTTAGAGCAACGCTAATCTGTGGATGT
AAACATAAATGTTGGGAGTTCAGTTGAACAGCCAGGTGTGGTGACACACGCTTTAATCCAGCACTCGGGAGGCAGAGGCAGGC
ATATTTCTGAGTTCGAGGCTAGCCTGGTCTACAAAGTGAGTTCCAGGACTGCCAGGGCTATACAGAGAAATCCTGTCTCGAAAAAC
AAAAACAAAAACAAAAACAAAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAAC
30 ATGACTGCCATAATCATGGAGTTTGTAGAGTTTGTAGAATAAGTATGAATTCCTCTACAGGGAGGCACTCAAACCAATCAGA
AAGTAGCTGGCTATCCCTAAACAAATACACCACTGTTGCAATGGTGGGCATATCTTGCCTAGCATGTTGGAATATAGTTAGTGTGAG
GTTACAGCTTAGGTAAAGACCACTGCTGACTTTCTTCCCTGGCAGCACTCTACTAGCCAGCAGGAAGGATCCAGTTCAGTTTCAGT
35 CAGCTGGATTTCTCTGTTTTGCAATCAAATGTGTGATGTCCTCAGCAATAGGGTCGAACCATCTGCTTCTGGTGGGCACCCA
AGAGGAATGACAGGGCCCCAGGGATCCCTCTGATCAACAACTAAGGAAGTACCTATACCTCCCACTGGGGTTTTGTCTAATAAC
CAATGCTTAATCAACATATGTTTTCTTCTCTGCCCATCACCAGTCCCTAGCAGACTGCTTGTCTGGCTTTATCAGAGTTGG
TCATAGTATTTCTACAAAGTATCCTTTATGGAGTTTCTCTGGGAAAAAGAAATAGCATCTTAACCTGTGAGGAAGCTCCAGAG
40 ACCAAGCAGTAATATGTGGTCCACAGTCTCAGGTTACACTAAGGATATTTATGACCATACATTAGAGAGGGACATACACACATGTG
AGCGCTACATGCAGTGACAGTGACAGGTGAAGGACTGGCCTGGGGAAGAGGGAGAGGACGGAAGCCACAGTGGCTGTGTTTATG
ATAAATGACAGACTTGCTTAAGAGATGGGCATGATACAGAGAGATTTGGGTTAGAACATGATGGTTGCTTGTAAAGCTAGGCC
TACTCTGGAACCGATGACTTTCTTTGGTAACAGTGGCTCTCGTTTCTAGAAAGAGAGTTTATGTTTTAGGGTTTCTATGGGTTTG
AGAATATAAATTTCTGGGCTGTGGGGGAGACACAAATCAGATAACCTAACACTGCTAAGATGGAGTGTCCCTGTTCCATGCAAGCT
45 CCCAGCCGGATGGAAACACACTCCTGACTTCCATGTTGTATCAGTTTGTCTAAAACATATCCATCCCAAGCTGCAGGCTAGAGGT
TGGGATGTGATGGAAGACTTCTTCCCGATGAGGGTACTGTGAGACAGATCAGCACTCAATCCAGCCACAGTGGCGATGCTCCT
GGCTCCTTGTCTGATGGGACTGAGAGCAGCTCCTCAACACTTGAACCTCCATTTCTGTCCAGGAAAAACACACACTATTGTTTCAC
GTTCCAGGATTTGCCATGAGGGTTAATGAACCTCGTGAAGGGGCCACCTCAGAACCCATCTGTCAACCATGAGGACAGGA
50 CTCTGTGTGTAGGGATTGCGGTGATGAAACAGTGTGATGTAGAAAAGTCCCAGCTTGGAGATGGATAAGGCCCTCTGTTTCAG
TCTCAGCCCTACAGAGGAAGAAACAGAGACTCCAGCTGCATACCCGCTGCAGAGTAGGTTCTGGGAGTGTGGCTCTCTGGGAA
CAGAGGTGTTCCAGCACTTCCCTGGGACTGCCAGTGCAGTGTGCGGCTCTCTGCTGCTACTGTTATCTTCTCCGCGCAGCA
CTGGCCACATCTCTCCTCTCACTCCTTCCCTCTACTTCCATCTCATCCCAATCCTTCTTTCTTTATTTCTCTGACTTCTCTC
55 TTGGCCCGCTCTTCTTCTCGGTGAAGATTGTTCTGATGACCCAGCATGTCAAATGACTCTCGGTAACCTTTTATTCTATTGTAT
TAATTTTAAATGATATATCAAACTGGGTCTCTAGAGGGGCAGCAAGTGTCTTAACCACTGAGCCATGGCTCCACCCC
CTACATATTTGCTTATTGTCATGGTTATGTGTGTGTGTCCTTCT
60 TGTGTGTGTGTCTGTCT
CCTCCTCCTCCTCCTCCTCCTCCTTCCCTTCGTCCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCTCCT
GTGTTGATGGTGTGATGCGGAGGTGAGAGGAGAACTCAGCGGAACCTGGAGCTAGAACTAAGGTCCGACAGGCTCAGCAGCGCA
65 TCTTTGTACACTGAACCATCTTCAAGCAACGTTTTAGTCTAAGCAAGAGGTTTTTTGTAGCTTTGGAAGGAGGGAAGAGATGA
ATCTTTTCATGTTCTCTAGACTGCCTTCAGTCTTTTTTCCCTCTGTGTGACATTTTCCCTTCTCTCATCCCTCAGCCTGTA
GTCATTAACCTTGCCAGACACTCAGCCATGGATTGTCTTTATGACGTTGTGAAAGTTAGGAGCGTGATTCACAGAGAATCAAC
CATATATTAACCTCAGGCACAGCAAAATGTCTAAATACATGCTGTAAAGTCAAGAGCTTCAGGATGACAAATCAACCACTCCTATTGG
AAGGGGGTGAAGCAAGACTGGCAGTGGGCAAGGGAGGGTGAGTTTCTGCCACAGAACTGAGCTGGGGCAGAACACTGCCCCCT
70 GGACACATACAGGGGCCAGCAGAGCACTTCCAGGACGTGATGGCGAGGGCCAGTCTAACAGGAAGTCACTGGGCTCTGCGCA
GCCTCCACTTGTTCAGTCTTGTCCCAACTTGAGCATCCACACCAGGCTCATTCTCTCTCTAGTCCCCTGGAATCCCTCTTA
CTCCTCCAGGGCTAGTTCAGTAAATGTGAGTAGCTACAAAAGATGAGCGCTGCATTAGATACAGTGCCCAATGGATACGTGA
GACCAATCCACATGCGGTACAAGTGTGGAAGCATCAGTACATGTGAAATGGGAGCAGCATCTAGTGGGAATCATGAAGTA
CCCTGATCCACGTGTCTGTGATGGATCAGGAATGGTGAAGAGAAGCCACACAGAGTCTGGGACACAGAGTCTGGGACATGCA
75 GCTCTTCAAAGCTTTTGTACTAGTCTATGTCTACATTTTATTAAAGATGTTACTTTAAATTTTACAATCATTTTAAATCTGAAT
CAGAAGTGGTATTGTTTCTCAGAAAGGAAGACAGCGATCTATTTTCCAACTCTTGGAAACATGATGTTCTTTGGGAGCCAGTG
CCTGATGAGAAGCCAGGGCTCTAGGTGCTGAGGTCAATACCAACACTTATGACTCAGTGTCCCCACACCCAGTCTGAACACC
TCTGTGAGTGGTGAAGGAAGAGTCTGCTCTGTATAGCCCTGGGCTTTGCCAGCAACCTCGTGAGAAGAGATGTCTAGGAAAA
CACACAGAAAGCAGGGTGTGTCATGTATGTAGAATCTCACTACAGAATGTAAAGCTTCGTGCTTCTCAGAACATTACAGTGTG
TAAAAGCTTCTGCAACACTTGAGGTGAGTGTGTGTGTCAGTCTAGTCAGCCACCAATCCATGTAGAGAAGAGGCTTTGTTTGGC
70 CTCTTTAAAGAGAAGTAACTGTGATTTTCTCAAATGTTCTGACCTTTGTCTGTTTACAGATATTCAATTTGTTGTTTGGTG
TTTTTGTGTTGTTGTTCTTCTAAGCTGGTGCAAGGCCACCAAGCTTTCAGTTGTCACTCTTCTTCCATTTGTGCTCTGGCCTG
AAAGAGTACCCCAAGTCTTATAAAGGCTTTCAGAGTTCACTGCCCACTTCAAGCAGAGGACTCAGACAGGATTCAGATAGTGT
GCCGTGCTGACAGGTGGTAGGTTCCATGTACTTGGGCTATGGGCATCTTGGTAGCGATAACACATTTTATAAAGAACATAA
80 GATGCCCCAGGTGTTGTTTGTGTGTATATCTTGTATGCTGCTTGTCTCTATTCTATGCCAGTCCCTTGAGAGCAGGGGCT
TCTGTTCCGCGCTGTGTTCTGTGGTGCCTTAGCAAAATCGATGCTTAAACAAATATGTTCTGTACCAAGCTTAACTTTATCTTA

AAAAAGCATAACAGTTTTTTAATGTATTTCTTTATAGAAAAGCAGAGCCTGGATACCTTGCAGTATTTTTTAAGTCTTGGCA
GGGGAATGCTAAGTCATGAAAAGTTCTCAATCATTGTAGAAAAGTGATTTTTGTTATGCTTTGACACAACAGGAATGGAGAATT
TTTCAAAGAACCTTGGCGATCACTTGCTTAGATTCTCTGCTGAGCGTAGTACCGAGAACTATGCCTGACATTTAAAGGAGGCGCT
AATAGATATTTGTTGGGTGTTGGAGAGATGGCTCAGAGGGCAAAGGCATCTCTACCAAGCCTGACAATCTGAGCTCAGCCCCAGT
5 CACAGCTCACTAGAGGAAAGAAATCGACTCCCTCAAGTTGCCCTCTGACCTCCAGACACTTACCAAGACAGCATGTATAAAATGT
AATGATAATTTTTTTTATAAAATACATTTGTTGGATGACTGAGTAAACAGCTAGTGAGCTGCTCCTGTGTGCTAAGTACCACATG
TTAAATCTCGGAGACTGAAATAATAAATGATTTGCATACATACCCAGTACTTTCTCCCTACCCAAGATCAATGTAGGAGA
10 GCTACTTAGCAAGACTATGTTTTAAAGGTCAGTGGCTGTGGACCTCAGTATAAGAGGACTTTTATCTCAGTATAAGAGGACTTGC
TTCCCGAATACAAAACCTGAATTTGATCCTCAGCACTGCCCAAAGAAAGGAGAAAATGTTATATCGTCTCCCTGAAACCAAGGAGA
AACAAAGAGTCGGCTTATGTCACTCTCCTCTTACGCCGTCTTACTAACCTTTGTCCCAAGTTGTTTCAATTTCTGGGCAAAGGG
CTCAGGATTTGCCCAAGATACAAATGGTGTCTAAAGGTAGCTAGGAAAAGCTACACCTCAGACTTCCAGGCCCTAGGAACCTCCAGG
TAAGTTAGTCAGGCTCTCTAGATGAACAGAGTTAATAGATCTTACGGGGCATCTATCAGATCAGCTTCCCAATGTGGACTGAACG
15 GTCCAAAGTTGACGCTAAGCATTCTGGGAAGGCATTGTACAGGAACTAATGAGATGGGGCTGAGGTGGGACAAAGACGTGGTCA
AGAGAGGGGAACTACAGTCAGATAGTTTAGCCTTGGGAGTAAACGTATAATGAGCCCTCCCTCTTCTCTCAGCCTTTCCCTT
ACTAATGTTTGGGTTTCTCTCTGCGAGCCTGTGGTTGACAGCTCGTTCCTAGCTGTTTCTCACACACTATGCTTTACCCCTG
CGCTCAACCACTGGCACCCTTGGCAGGCTGCCCTCCCTCTGAAAGATCTTCCCTAACCTGCCCCCTTGCAGACAGACTTTCT
AAATGTGATCAATTAGCCCCCTAACCTGAGCTTAGCCTCATTCTTAGTGGGTTGCACAGGCTCCCTTAATACAGATGTGTTCTTA
20 TTCTCTGGTGTCTCTCGCCAGGGGACCGCTGCATCCATCTCTCATCTCTCCAGTCTGTTAGAAGGGTGTGTGTGTGTGTGTGT
GT
CAGTGTAGTTAAACACAGGAGCTGGCCATGGCTCCAGGCTGTCCCTGCGCTCCCTTGCATTGTCCCGCACAGCAGCGAGTGTCT
ACCATCTGACACCGTAGGCATTACCTCATTCTCTGCTCCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
25 CTGATCGGTAGAAAATGTCTCTGATCAGATCAGTGTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
CTCAGTGTCTCTCATCAGGCATGTGCAGACACATTAACTCCACAGATGGCTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
CCCTTTCTGGAGTGGCTGTATCTTTTCCACACTGTGTGAGTCTCTCTAGATGCTTTGTGCAGCCTAACACTGTCTTCCACC
CGCCCCCAAGCTACATACCGGTGACTGTCCACCCTGGGCGGGAATGCGTGCACACAAAGCAGAGGTGTTTGGAGAGATTGA
CATAAACCCTCTTCTTGGAACTACCTTAGTCTGGTTAATTTCTCAAGAAACACTTGGCTGTAAAGTCTGTTTATTCTACCT
CATGCTCTGACATATAACCATATATTGCTTCTGTGTATGTGAGTGTCTCCATGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
30 CTGGGTGTCTGATACCGGTCTCATCAGCTGCTCTTGTGCTGCTAGCAAGATACCCCCAGACTCCGTGGCTTAGGACAGAGGCTATT
TATTATTTTTTATGGTTTCTGTGGTCCACTGGACAGTTCTGGTTTGCACAACTTCAGCTGCACTGAATCACCGGATAGATGTG
GGTGAACAGTACCCACAGCTGCCACCGCTCGGTGTTTACAAACAAAGAAAACAAACAAACAGTACTGGAACCTCAGGCACACC
ATACTGCCAGCACTGCTTTACCTTGTGACAGCAGGCAAGTCAAGTGTAGTGGAGATCACACATGGCCTACATGTGTGCTGTTT
GCTCCCTCAAGGAGACATTTACTAACTAGAAAACCTTGGCGAGCCTGCTCTGGGATGGCCAGGTGGAAAGGGCCTTACTTGGGG
35 CAGCTTGTCTTTCTCTGTGCTCTCAGCGCCAGGGGACTGGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
ATATACCTCCATAAGCCTCTGCTCCCAAGTGTGGGTTAAAGGCATGCGCCACCATTGTGTGCAGAAAATGCTTGCAGCTTGG
CTCCCCCAGATATTTCTAGGCTCTGAAGCTGCTTCCCTACAAAGACGGGTCTTCCACAGATTATCTAAACCTGTTTGTGATCCA
GCTGTATAGTATAAACCTGCTCCTTGTCTTACCGTGTGTAATAATTCCACCTCTCTGCTGAGCTGTATGCAATAATTAGGAAT
CTCTGTCCAACCTTAAAGACCGACATGGTGAAGCTTCCAGGCTGTTTCAATTTCTCCATCAGAGGGCCAGACCCTGAGGGCGGA
40 AGAAAACAACTTTCTCAGTGTCCATGTGTGTCAGGTGCTGCTTGTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
TGTGATGATGATGGATGGCTCTTTGGGAGAGAAATCAGGAATAGTATTGTGTAATCTATGTGCCAGGAACAGCCTGTAGAT
GCGGTGATGGGAGGATACCTACAGCCTGACTCGGCTTGTGTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
TTCAGGAATCTCTCAGGAAGGAGCTATAGCATAGCTATAGCTCCTACAGGCGATGTGATGGCTGGTTCTCAATCTGATTAGAT
TAGTAAGCAGATGAGAGACTAGTAAAGTGAACCTCTTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
45 GACCTAGTCAAGTGTGTTAGTCCATTGATACATTCTAAGTCTGAAGAGATTAATGGAGGTTCTTGGCACTTCTGGCTGGTGAAGG
AAGCAGGCTATGTAGGAATGCTCTATGGGACTGTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
ATAAGCTGTACCGCATGGCCCTCTCTCCATGATGAGTTAGAATCTGAACTCGGGAGCTAAATGAACCTTTCTGCTTTAAG
TCGTTTCTGTCAGGCATTTTGGTTTAGCTACAAGTAGCTAACCCAGCTGCGCATATTACCTCCCGACCTCACACAATTATCTG
50 AGCTTTCTCAGATGCTGCTCTTGAAGCTCTTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
GTAACCTCGGAAGTCTGATTCACTAGATTGAGTCCCTCAGGTTTCTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
CATGCTGCTGCTTATTGCGCTGTGGATACACAATATTCCCTTCTCCACATGCTGCTGAGATGTACCCCTCTGATGAAGCAGGC
TCAAGTACCCTACCCGCTGCTGCTTCCCTGCTGCTTCTCCAGCGAGCTCTTCTTCTCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
AGTGTGATGCAATGGGGTGTAGCACACACTGCTGCTTAGGGTTAGAGTGCAGGCCAGGTCATGACTTTAACTGCTTAACTGCT
55 TCTGAATCTCTTAAAGGGGAGAGCTAGAAAAGTCTTGGCTTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
ATCTGCTGATCTGTACCCAGTTCACCTTTATGAATAATGGACAAGTATTGGCATGACTGCCATTTCCAAACCTTGGTCTTATT
CCAAGAGTCTATTGGGTTAAATGTATTTCACTACTCATTAAATAAGAAAAAATGCTGCATATAAGCCATCAATTATATAGTGTATC
TGAACCTATGTTTCTAGCACTAGAAATATAGATTATTAAGTCTAATTAGATGGATATAGGTGACTCAATATATTTGAAAACATT
GAAATATACCTGTCTTAGAATCTCAAAACAGCTGTGGTAGAAAGGTTGGTACATGGTAGTATCTCTTCAAAAGAAAAAAG
60 TTTAAGTTAAAGAAACTATAATACTTGTACAGAAATTAAGTAAATATATTTTGTTTATATTAATAAATATATATATATATA
TACGATATATACTCAAAGTGTAGGCTCTAGCCTTATGATTGAGACAAAGCTTCTTTCTAAATCACCTGTGGATATCAAAACCT
CAGCTCTAAGATTGGTATCAAACTGATCTTATTTATAAATTGCTATGCACATCACTGGACCTTCAGTTGTCTTCTGGCTACT
CATCCGCTATTACTTGTATAACATAATGTGATGTGTTTACATGCACTCAGGAGAGATTAGAATGATTATGGGTACATATGT
TTTCCGGGGATGTAATTAGGCAGATTCTCACACCCTCATCAAGAGATTTCACCACCATTAATCTCAAAATAATAGAAGGCTT
TCTACTTCCAACATTACTTGAAGATTGTAGACGCTCTCTAGATGAGCAATTAGGGGGAAAAAAGGCTTGTGTGAAGTTTG
65 GGTATTGTTTACTTTAAACAGCACTGTGCACTTTGGCATATGTAATTAATAGACTGATGTTCTGAGGATAGATCTGCATACC
ATTAGTTGTATTTTGTTTTACATAGTTTGTAGGTGGAAGGAGGGGCTTCAAGTTGAGGAGGCTCTCCAACTGCAGCATCTC
GAATGTGTTGATATCTAGAAGAAGCAATGTAAGAAGAAAGATTGAGTTAGCATATGGATGTGGCAAGTTTCTACATAGTCC
CAGATTTCACTGATGCAGGAACCATGGTATGCAGGCGATCATGGCAATGCAGCAGCTGTAAACAGAACTTCTTACTTCAATGTA
GTCAAGGATGGGAGGTGGAGATGGGATGCAGGATGAAGAGACAGCACTTAAGAGCACACCTACAGTGATTCTTCTTGCAGGCC
70 CTATCTTCTACAGTCCCCAACCTCCCAAAATAGTGCCACCTTATGGTTATAGTTACTTTTGTGTCTCTGTGCTGTGATACCATGA
CCAGGGCACTGACAGAAGAAACAGTTTATTGAGGGATTTATTTTTCAGATAGTGAGCCCATGGCCATTATGGAGGGGAGCATGGC
AACAGGAGGCAAGCATAGTGTGGGCAATAGCTGAGAGCTTATATCTGTTCTGTGAGGCAGCATGGGGGAGAGAGAGAGAGAG
GAGAGAGAAGGAGGAAGGGAG
GAGAGAGAAGGAGGAAGGGAG
75 GTGTTCTGAACCTCAAGTCTGTGCTTCTGTGACACATCTCTCTAACAAAGGCCAACCTTCCAGTCTTCCAAACAGGCCCCA
ACAGCCTGAGCCCAAGCATTCAAATGTATGAGCTACGAGGCTCTCTCATTCAAACCACTACACTAACCTTCTCTAAACAA

352

5 TGTGACAGGTTCTGATTAGACAGAAACCATTCCATCTCCAAGGAGAACTACTCAGTGAACGTGGCTTCTAGAATGAATTGGG
TAGTGTTCATTCTGTTTCTATTTTGTGGAATAGTTTGAAGAGTATTGGTAGTAGGTCTTCTTTGAAGGCTCTGTAGAATCTACAC
TAAACCCATTGGTCTGGGCTTTGTGTGGTTGGGAACTTAATGACTGCTTGTATTCTTTAAGGATTATGGGACAGTTTAGATG
GCTTATCTGATCTCGATTAACTTTGTTATTGGTATCTGTCTAGAAAATTGTCCATTTCATCCAGATTTCAGTTTATTGAGT
10 ATAAGCTTTTGTAGTAGGATCTGAGGATTTCCTGATTCTGTGTTTACATCTCCCTTTTCATTTCTAAATGATTAATA
TTTGATACTGTCTCTGTGGCTCTGGTTAGTCTGAGTAAAGGTTTCATCTAGCTTGTGATTTCCTCAAAGAACAGCTCCTGGT
TTTGTGATTCTTTATATAGTTCCTTTCTATTGGTTGACTTCAGCCCCAGTATGATTATTTCTGCTGTCTGGGTGTA
TTTGCTTCTTTTGTCTAGAGCTTCAGGTGTGCTGTGAGGCTGTAGTGTGACTCTCTCCAGTTTTCCTTTTCTTTTCTTTT
TTTTGGAGGCACTCAGTGTGAGTTTCTCTTACCCTGCTTCATTGTTCCCATAGTTTGGGTATGTTGTGCTTCACTTTT
15 CATTAACTTCTACGAAGTCTTTAAATTTCTTTATTTCTCTCTGTCCAGTTAAACATTAAAGTAGTGTGTTGAGTTCAGTTCATGTGT
ATGTGGGTTTCTGTTGTTTCTTGTATCGAAGACTGGCTTACTCCGTGGTGATCTGACAGGATGTCATGGGATTATTTCACTGTC
TTCTGTATCTGTTGAGGCTGTTTGTGACCAAGTAATATGGTCAGTTTGGAGAAGGTACCATGAGGTGTGAGAAGAAGGTATA
TCTTTTCTTTTATAGGATAAAATGTTCTATAGATATCTGTTAAATCCATTTTGTCCATAACTTATGTTAGTTTCACTGTGTCTT
TGTTAGTTTCTGTTTCCATGATCTGTTCACTGAGGTGTGAGGCTGTTGAAGTCTCCAATTGTTATTACTGTGAGGTACAATGT
20 TGCTTTGAGCTTCAGTAAAGTTCTCTTTATGAATGTGTGCTTGCCTTGCATTGGAGCACAGATGTTCAGAATTGAGAGTTCTCCT
TGGTAGATTCTCCATTGATGAGTATGAAGTGTCTTCTTACCTTTTGTAACTTTTGGTTGAAGTTGCTTTATTCGATATT
AGAATAGCTGCTCCAGCTTGTTCCTCAGACCGTTTGTCTGAAAATTGTTGTCATGTTTATTCTGAGGTAATGCTGTATTT
GTCACTGAGGTGCATTTCTGTATGAAGCAAAATGTTGGGCTCTGTTTATGATCCAGTCTGTTATTCTATTCTTTTATTGGAG
AATTAATCCACTGATATTAAAGAAATTAAGAAATAGTTATTGTTGCTTCTGTTATTGTTGATGTTATTTTATATTCTGTGG
25 TTAICTTCTTTTGGGTTGTTTAAAGAAGATTACTTTCTAAGTTTCTAGGGTGTAGTTTCCCTCTTGTGTTCTGTTTCCCT
TTATATCTCTTTGAGGTTGGATTCTGGAAGATATTGTGCAATTGTTTGTGATGGAATATCTAGTTTCTCCATCTATG
GTAATTGAGAGTTTGTCTGGGTATAGTAGCCTGGGCTGACATTGTGTTCTCTAGGGTTGTATGACATCTCCAGGATCTTCT
AGCTTTCATAGTCTCTGGTGAGAAGTCTGATAGGACTGCTTTATATGTTACTTGACCTTTTCCCTTACTGCTTTTAATATTCTT
CTTTGTTTGTGCAATTTGGTGTTFGATTATTATGTGTGTCAGGAGGAATTTCTTTCTGCTCCACTTATTTGGAATTCTGTAGGC
30 CTCTATATGTTTATGGGTATCTCTTTTAGGTTAGAGAAGTTTCTCTATAATTTTGTGGAAGATATTTACTGGCCCTTAA
GTTAGGAATCTCTACTCTATTCTATACCTATTATCTTAGTTTGTAGTCTTCTCATTTTGTCTGGAATTTCTGGATGTTTGGGTT
AGGAGCTTTTGTCAATTTGCAATTTCTTTGACTGTTGTGTCAATGTTTCTATGTTATCTCTGGACCTGAGATTCTCTCTAT
CTCTATATTCTGTTGGTGATGTTTGCATCAATGACTCCTGATCTCTTCTAGGTTTCTAAGTCCAGGGTGTCTCCCTTTGTG
ATAGTTTGTCAATTCCTTCACTGTTTGGTTGTTTCTGCAATTTTAAAGATATTTTGTGTTTCTCTTTAAGGGCTTCAA
35 GCTGTTTATCTGATTCTCTATACCTTTAAAGGAGTTATTATGTTTGTAAAGTCTCTCTCATCATCATGAGATATGAT
TTTAAATCAGAGTCTGCTTTTCTGAGGTATCCAGGGCTCACTGTGGTGGGAGAACTGGGTTCTGATAATGCCAAGTAGCCTTGGT
TTCTGTTGCTTATGTTATGCTTGTGCTTTAGACATCTGTTTATCTCTGTTGTAGCTGGTCTGCTGTCTGACTGTGGCTTG
TCTCTCTGCAAGCTGTCTATCAGAACTCTGGGAGACAGTTCTCTCTGGGAGGAATTTGGGTATGGAACAGCTGTGTACAAGG
TCAGCTCTGGGGTGACAGCAAACTGGAAGGATCTGTCTCCAGCTGCTCTGCTTCTATGCTCTGAAGGCTCTGGGAGGTC
40 CCAGGAATTTGAGCAGAAAGTGGTGGTCTTACCTGTGCTCAGGAGCATGTCGAACTCTCTGGGAGACTAGCTCTTCCCAAGGGTAT
ATAGATATGGAGTGCATGACATGATCTAGAATGCTTTATGATACGAGTCAAAATACACTCAAAGACAAAGCGCTGTGAAG
GCTAGAATCTTACATATGGCTTGAATATATAAAATGTTAAACTACACATGACATTGGAATGTATACATTTCTAAATAGGCC
TCAATATATGTAACAAATTAATAAACTTTAGTGAAATTTACATATTTCTTAAAGGTATCACTTGATGGCGCAACAGAG
TAATAAATCGGAATTTAAATAGGTAGGAGAAGACATTTTTCATAGACACAGGAACTGCACCAAGCACCTAGAATATGCAG
45 ATCCACTCTGATGAGGAATTTTAAAGAAATTTTAAAGAAATTTGACCTCACATAAATGCAAAATGCTGCTCAACAGATTTC
GGAATCACAATTAAGATAATCATATATTTTAAAGATTTATTTATTTACATATATGATACACTGTAGCTGTACAGATGTTGTG
AGCCTTCAATGTTGTTTGGGCTCCAGTCAACCCCAATTGCTCTGATCAGCCCCGCTTGTCTCAACCCCAAGATTATTTATTAT
ATAAATGATACAGTGTAGTTGTCTTCAAGTGCACAGAGAGGTCATCAAGTCTCATTACGATGGTTGTGAGCCACCATATAGT
50 GCTGGGATTTGAACTCAGGACCTTCAAGCAGTAGTCACTGCTCTTACCTGCTGAGCCATCTATATTTATGACAATTAAGTTACC
ATTCAATAACCATACAGTCAAGCCCCCTCCCAAGTTCCCTTTAAATGTGGAATTTTCAACATTTCTGAGTAATCACTAAACCGG
AAATTTTAAATACTTAGAATGAGTGTGATGAATAGTCAATTTCAAGAACTGAAGGATGAGCAGAGATGATGATGAATGA
CTGTGGGCGAGTAGAGGGCAGGATGAGGCGAAAACAGTAGGCAGGAGTACATTGGCAGTAAAGATGCTGTCTAGTGAATCTACAG
ATCCAGAAAGATGCTTCTGTGATAGGCTCATGGTACAGGATCAACAGACTTTTCTTTTGTAAACAGATCATATGCTGGC
55 TTTGTAGGTGACACTGTCACTGCTCAGCCTTGCCACCACAGTATGAAGCAGCCATGTGATGTAATAATGACTGAGTGTGTT
CTGCTCTAATAGTTCCATATATAAACTAGCAATGGACCATCTTACTATTGAGACTATGATTTCAGAGTTGTTGAACTAGTTATAT
GTCTAAACTGACCGTAAATGATGGAAATTTGAATAGATTGCTGGATATAAGATCAGTATACAAAACAAATGCTCTTTCATT
GTCAGTATCATGGAAAGTAACTTTTAAAGAGTGGTCACTGAGCCAGTGGTACTTGGCTATAATTTTACCCTGCAAGGCAAGA
TGGCTATGATTTTAAACTAGCCTAGACTACATAAAAGAACTACCTTAAAGAAATGCTTAGGGTTGATGAGCAACAAAAT
60 AAGTAATAAGTGTACTAATGTTCAAGTCTAAAGAACTAAACAAATTAATGATCTGCTTCAACCCAGTAGTTCTCAAAGTTG
ATTTCCAGATCTCTATGCTCTAAACAGCTGAGAAGTCAATAGATCTTACTTAATTGGGCTTTATCAATCCGTAGTCATAA
GACATTTAAGTCAGCTACTAATTTTAAATAATGAATCTGCTATACATAAATGTTTGAACATCTTTATGAAGTAAATTTGCAC
TTTCAATTAATGATGAAATGTTTATATTTTCCAGCTCTCTTAAATGACAGCATAAATAAAGGCACTGGAGTCTGTATAG
CTCTTCAATGTTGAATCTGTGTGCTGTAGTTTACTTTTATATATGAAAACCTATGTTGTGACCTGACAGTAGAGAAAGG
65 GACCACTTTAATAGCTCCCAAGTTTCCAAACAAATGGAAGTATCTCTTCTTGATACCTTTATCAGTCTTTGGCAGGTACATAGT
AAGAAGGTAGTTGCAATATGGGACCTAAACTGTATCGCTGAGCTTGTGATGTTCCATCATATTAATTAATGTTCTGCTGAC
ACCTTGGATGATCTTTTATCCAAGGATGGTTGTGGAAGGCAAGTGTGACTATTGGGAAAGGCTGGGTTGGCGAGTTAAGTAGCT
CTTCAAAATGATGATGTTTATGTCAATTTTCACTTTTAAACATGATCTTCAAGGGGAAAAAGCTTCAAGTTCCGAGAA
ACTGTCAAGCTAACAGTAGCAAAATGACACTTACCAAACTCTGAATTTCAATTGAAAGCTTAAATTTTATCATTTGGCAGCAATA
CTGTCACTGTTTCTCTGAAGTGACAAATCTCACTCACTTGTCTCACTGTCAAGAAAGTATCTGCCAAATCCCCAGCTCTGGATA
70 ACCTCAGTTTGTGAGCCGTTCTCTAGTAAAAAAGGAAAAAATACATTATGTGGGAGAAAAATGTGCTCAAGCATG
TTAACTTCAATTTTGGCTGAGCAGGTGGCATCTCTTAAAGCCCTTAAATCTAGCAGAGGCAATGGGAAGTGTGAGTTCAA
CCCAGCCTGGTCTACATAGTTTCAAGCTACCAAGTTACATAGTGAAGCTTGTCTCAAAATTAATTAATTAATTAATTAATTA
GTAAAAATATTAGATAAATCTACAGTTCAAACCAACCCCAAAATGCTCTTCCATGAGCTAACAGTCAATTTCAATGTCAGTGA
TACTGATTTGCACAGAACATTAAAGTGTAAAGTACTCGAGTGTCTTCAAGAGAAATAACAGTTTCAATGATGACAGAAATCATTCAT
75 TTTATTAATAATAAAATTTATTTAAATAACAACTTAGCATTAACATTTTAAAGTCATCAAAATAATTTAATAAGTTAAAT
GCCTCTTAAATGATGTGACATCTTCTGAACTAAAGTAAATGACATCAACAGTCTTTTGAAGTCTGTTTGAACATTAAACAT
GATCGAGGTAGAAAAAATCTCTTATGAAGTCTCTAAGAAAGGAAATGTGACAGGTTCTGATTAGACAGAAATCATTCAT
CTCCAGGGGAAATATGCAAGTGAATCTGTGGCTTCATAGACTATATTGGGTAGTGTTCATTCTGTTTCTATTGTGGAATAGTTT
CAAGACTATTCGTAGTGTCTTTTGAAGGTCTGATAGAAATCTGACCAAAATCCATCTGATCTGGGCTCTTTTGTATGGGA
GACTTTTAAAGTCTGCTTCTATTTCTTAGTGGTTATGGGACTGTTAGATAGTTTCTCTGATCTGTTTAACTTTGGCAGATGG

354

[illegible]

ATTCAATTCATTCAATTTTGGCTTACTCACTTCCAGCTCAGTGCCTGCCTCTCAGTACCACCTCCCACAATTCCTGCC
CCGCCCCCTTCCCTTCTCATCTGAGCAGGTGGGCCCCGGGTGTACCCCACTCTGGTACTTCAAGTCTCTCTGAGGCTTAGGTAC
ATCCTCTCCCACTGAAACCAGACAAGCAACTCAGCTAGAGAACAATATCCACATACAGGCAACAGCTTTTGAGATACCTCCCC
TGCTCCCAATGTTCAGAACCTCATGAAACCAAGCTGCACATCTGCTATGTATGTGAGGGGAGGCTACGTCAGCCCATGTATG
5 TCTTTGATTGGTGGCTCAGTCTCTGAGAGCCCCAAGGGTCCAGGTTAGTTAACTCTGTGGTCTTCTCTGGAGTTCCCT
ATAGGAGTCCGAAATCCTGGAAGGACTCTTTTACCATGGAATGATCTCAAATTTTATATATATAATAAATTTTATAAATTTATA
CATATTTATACATATGTGTGTGTACGTGTTGAATATGTGTACATATGTATACAGACACATACGTCATATGAGTGTGAAGG
10 CCAGAGGATAAATCTGGATGGCTTCTCAATCATCACCATATATTTTGTGAGGCAAGGTTTTCGCTGACCTAGAACCTTGCTG
ACTTTGCTACTCTAGCCAGGCGAGCTCCCCAGGACTCTTGTGTTTCTGCCTCCTCAGCCCTGGGATTCAGGCATACATCACTA
CAGCTGGCTTCTTACATGNN
15 AATGAGAATTAAAGTGCATATCCAGGTGCACATCTCTATGCATATATATGGAGACCAACAACAGCATTGGTTATCTCTTCAGC
AGTATCCCTGGCCACCTTCTCTGTACCCAGCAGGGTCCCTCAGTGGCCTAGAACCTGCCATGTAGGTCTGTCTAGCAAGCCCCA
AGCTTCTGCCTGTCTGCCTCTCCAGTCCCTGGGATTTAAACACACACACCACATACCTGAACCTCAGGTCTCCACACATCTCACCAGA
TGATCTGTCTCTCCAGCTCACAGGTAGGGAGATTTTAGAGCTCCTTTTTTTTTTTTAAATGTACTGTACATTATATAATTTGTACAT
20 TGATATGGGTTTTCATTGTGATGTTTCCATGAAAGCCTTTAAACAAATTTGATCATGTGAGTCTTCAATCTCTGTTGGCCCTT
CCTTCTCCTAATCCCTTTTCTCTTCTGGAAGCCACTCTCTTTCATGTCTTTTCTCTAAATTCATATGAAAGAAAAGC
TGATATTTATCTTTATGAGCCTGGCTTTATATTAATATGATATATCTAGTACTGTCTGTTTCCAAAGCATTCTATTGTGG
TATGGGTGGTGGGTCAATGGCTGGGTAGATGGATGGATGGATGGATGGATGGATGGATGGATGGATGGATGGATGGATGGATGGAT
25 CAATTTCTGTATACCTTTGAGACTACATAGTCTGATTCTCAGTTGAGGGCAATGTGAATAGTGCCACAATAAGAGTTGTCTATGCA
AAGTATTCGACTTCGACTTCTTCTCACTGTATATCCAGCAATGGCATAGCTAGATTGGTAATCTTGGTGTGTTTAAATGAATGTC
TATTCGTATTTCCATGGTATCTATCTGGCTTCTATTTCCAACTAGCAGTGGACACGGGCTTCTTTCTGTGCTGTTATTGTCTGT
TCTCTGTTATCTTGGTGGCAGCCATTCTCACTCGGGAGATGAATCTCAGTGAAGTTTGATTATATATTTCTGTGGTTAAAGA
TGCTGGACATATCTATTGCTTATTAGTATTTCTTCTTAAATATGATCTGTTTCTGAGTACTTGACCACTGATTGGTTGCATCACA
30 TGTTCTTTGTATTTTCTGATACCAATCCGCTGTAGATGAATCACTTGGAGGTTTCTCCATTGTTGTGAAGTGTGGCTTCTCCT
CGCTAATGGTTTCTTTGTGTGTCAGAAGCTTTTCAATATCATACAATCCAGTTGCCAGTTCTTGCCCTTATTTCTGAGCTACA
GGCGCCCTATTTAAAAACAATAATCACTACCTGTGCTGTGAGCTCGAGTGTATTTCCCTGTTTCTTAAAAAGTTGTAATAT
CTCAGGTTCTGAGTGAAGCTGTTTGGAGTGAATTCGCTGTCTCAGTCTTCTACCTGTCTCAGTCCACAGCTTGAGGAAGTGC
TCATTCTTCAGGATGCTGTGTTGTACCTTGTGTTGGAAGCAGATGGCTGTGTCACGCTGGGTTGTTTCTGTGTTCTTTCTCATGG
TTTCCATTCTGTGTGCTGAGTAAATATCTGAACAAAGCAATTCAGGGGAGGGAAGCTGTCTGTCTGAGGTTTGAAGGGAA
35 GGTGCATCTGAAGGGGTTTCTTACCTGGGCAATTCAGTCTGGCGGAAACATGAGCCTAATGTGTTAATACCATGGCTGAATTC
AAAGGGGGGAAATGAGTTTCTCTCTCTCTGAGGAGCTCCATCATGATTTATGGTCTGTAAAGTAGGGGTGCTTCCAGAAA
CTGTTTCTCTTCTTGTGAGAGAGCAGTGTGTGAAGATGGGCTTTAAAGCCCTCTTGTGTTCTCCGGCTAATGTGAGGAACCT
ACATGGCCCCATCTCTCTGGGCGAGCAGTGTGATTTGTTTGTGATTGACAGGTGAGCAGTTTAAAGCATGTGAGGGGTGTTG
TGTGTGGCTTCCCATGGTTATGCTATGCTCCATGTCACCATGAGGTATAATTAATCTCATAGTCTCACCACCTCGCGGTTGTTT
40 CTAATTTAATGAAATAATATCATGTTGTCCCCAGCTTACTCTGTGTGTGGCATGTTGTGGGTGCTCAAGGAGTATATCTCAACGG
ACAGAAATGAAAGAGGTTAGTACTGTAGCCATGTTGAAATTAACCCCTTACAGTCACTTAATCTCTGTTAGGCTAAGAGCAG
TGGCTGACATTGGTGGTGAATAAAGTGGGATGGGACACAGAGAACTCCTTGAGGAGTGGTGGTCAATCTCTGATTTGGTAAGGTG
TGGATTTACACATATATTCATTATCAAACTCAATGGCTTTTCCACTCAAGATTCAATAAATGTCTATATGTGTGTTGTCT
CAAGAAAAAAATCCATCAATCAGTCTTAATTTCTAGTACATATATGCTCCTGAAATATTTATGGAAGAGTGTGGTCAATTTCTG
45 CAATGAGCTTGTCTCTGCACTGAAAAAATAATGGATGAGGACATGGGATGCTAGAGATGTGTAAGAAATGTGTGTTAACTGACAGA
TTCTAAACAGAGATATGTATGGATTGGATGTTCTTATCCAAATCTAGAGACCAGAGTATTTACAGCTTTATTTTAAATTTTG
GAGTATTTGCATATGCTTAGTGAGCTGTTAGATATGAGATTCCACTGTAACAATTCATTGTTTCTGCAATGGTTGAGGATATTTG
ATCATACTGTGAACCCCAAGATTGTGTTGTTTAAATGAAAAAATCTGTTTCTAGTTGTGGTATGTCTCAGCACTTACACACACT
50 TTAATTTCAAAACAATAAGGTACAGTTAGTTTGTAGAAGGAAGTCCCATGTTTGAAGTGTATGCTAATTTAGCGCGCAGACAAAGT
GACTAATCAGAGAAAGATTGACAGAAATAGTCAAGGTAGTATATACCCAAAGTCTCAAGAGAAAAGAGAGGGAAGGGGAAAGCTAG
TTAAGTGGCAGCATGGAAGAGTGAAGGAGTGAAGATGAGAACATATTGCCATAGTTTGAAGGCCAGTCAAGAACATTCGGTGAAGTGA
GAAGCCAGTTTGAATCAGTCACTTGGAGACGAGTTTGAAGCCAGAACAGCTGAGTTGAACAGCCAGCCAAAGTTGAGAAAGAAC
TAGGAAGTGTGAGCTTATTCAGCAGTACTCTCATAGGCTGAATTTATCTAAGCCTAGATAAGATTTTATGGATGCTAGAAGCTT
55 CCAGACTAGGCTACGTTAGCAGACAGAGGAGTAAAGCTCGGAGACATTTACTACAGGAAATAAATGTTTCTGCAATGTTTCCGATGCT
GTAGTTTACATATATAGACAAAGTCACTTATCATATAATTATTATTTATACATGAAACGAAGTGTCTGATGTTCCAGTTTCTTT
TTGTTGTGACATATCAGCACTAAATATGTTTATAGTTTGAAGTTTCAATTTTTCAGATTAGGGAACAATTTGTAGTTGTTAGCT
TTAATATATATGTAGTGTGTTTATATAAATGAAACCTTTTAAAGGGAGCAGGGGAGAGGAGGAGGAAATAGGGGATTTTCA
60 GAGGGAATACTAGGAAGGGAATAACATTTGAAATGTAATAAGAAAAATTAATAAAAAATATTTGTTTATTTATTTATTTAT
TTATTTATGTAATAACATTGTAGTGTCTCTCAGACACCCAGAGAGGACATCAGATCTCTTACAGATGGTTGTGAGCCACCAT
GTGTCGCTGGGAAATGAACTCAGGACCTTTGCAAGAGCAGTCACTGCTCTTAAACCACTGAGCCATCTCTCAGCCCCGTACACTT
GAAATCTTAAATAATTTTCTAAAAATCAAAGGGCAAAACCACTCATGACCTTGCAATATGACACCAAGTCCACTTGACATTTT
TTACCCACATCTTCTCAGGTTTTCATCTGCTCTTGAACAGAAACATCATCTTGTAGAGACACCTGGTGAACCCAGCAGT
65 AGATCTTTATGATCTATAGAGGGCCCTTTTACTGGGGTGAGGATTTGAAAGACAATTTAAAGGACAGAGAACTTTATACCTT
AGCGTGGCGACATACAGGATAGTCTTCTGCATCACCCTAAAAACAGTCTCCGTCTTATAATCATGTGCATGCCAGAGAGTAACC
ATTTTATTTGTCACCTAAGGAAGACCTGAAGAACTACCATTTCTGTGATATTGTGAGAAATGGCTACCTTACCTACCCCGGTG
TGTCATAACTCCCTTATAGAAATGACGTGGAAGTTACCAAGCTCAAGTGCAGGGCAGAACTGTCTCCAGTGTCTTATTCGTACT
70 TTTCTTGGTGTATTTTCTCTCGTCAATATAGTAGAAGCTAAAGCCAGACATGTGCACCCCTCTGTAGTTACCAATGG
CTCTGTGATCTTGTGGGCATTGCTTACTACCTTTGGGTATTAATTTCCACAATCTTTAAGCAAGTTGATTGAGTCAGATCATCTGC
AGTCCCTTCTACCATTTGGGCTGCACCTGCTGTAGTGAATCTTGAACCCATACCTTGGCATAAGATGAGGAGCCCTGGTCCCAT
65 CCAGATGAGATCAGATCTACAGAGACTCATTACATAGTCTTAAATACTCACTTTTGTAGTCAAGTGAAGTCTTCTCTGCTTT
TCCTTACTATCTGAACAGGCAGAAAGCAAGATGATTTCTAAACCTCTACTAAGAGTATCAAGAAAAAGAACAAAGAAAGGGA
GTTGAAGAGTGAACCTGTACATTTGGTTCTTTACACAAATCCATGTGACAAATCTCTTACGCTGCTGTGAATTTACACGGCAT
ACGCTGCTCTGTCATTTACAGCCAGAGTCTTGGCTTCTCAGTGTGGAATGGAACCTCAAGGCGATGAGTGGTTTGGTCTATCACA
70 GTGTTCAAAACCACTCAGAGCCATTAGCTGGGTAACTTTGACCTCTTCTGTGATACCATTTGCTCACTGTGCTGCAAAATCAGAGT
TTCAACTCTTAGTGAATATGCTCTGGCTTACTGTAATTACCAAGGCTGGTTACATGACACACATATTTGGATTTCATAGTCAC
ACAGGTACATATAGTCCAGATGTGGTTGTATCCAGAGTCTTTATTGTAGTGTACATGCTATGTTGATTTCCGGTATGGACT
CCTATGTATTGTGCTCAATTTGATTAGCTGTAACCTGGATGTGAGTGGAGCTGCTTAACTAAAGAGAGAAGCTAATTACCAAGG
75 ACTTCACTTTACTAATGTACTCAGGCTGAAGATGTGTTAGGTGTTAGGTGAGATCATGGACAAGCCATCTGATTGGTCCATTATT
ATATTTCAATTATCTTTCATATTCAAGAGAGACATTAATATAGCTGAGGATGACATAGCAAAATACCAAGCTCTCTAACCTT

TAAATTGCTAATACTGTTGTAATCTGTAATTATAGAAATCAGTGTGAGAATTGTGGCAGTGCATAATTATCTTCTGATACCTTTAT
 TGCTGAATGAATTATTAATCAGAATCAGTCTTGATATAGTATTGTCAGCAACGCAGAGAATAATGTATAATTAAATTTTATTATTTC
 TGATTTTGTGTTAATGTTTATGATGTTGTAATTGATAATTAATTGGCCAAAACCTCATACAGTACTTGGAAAGTTTCAGTGGGTG
 5 GGAATGTTTCAGTGTGCTGAGTTTCACTAAGCAGTAACTATTCTGCAAGACCAAGGGATCTTGTCCAAGCTATGTGAGAGAG
 TGCTTAAAGTGGTGTCTAAGCTTGAGCTTTTACATTTCCTTAAAAAAGCAATAAATCTGTGAGCATGTACAAATGAT
 GAAGACATCTTGATAGCTTTAGATTGGGTCAATTTAAGTAATCAACATAGGTTGAGAATGTAGACTAATACAGTCGGTAATT
 TGGTATGCCCTCTCTATATGTCAATTTCCATCTTATTCAATTAACCATCTTCTCCACATTACTATAGTGTGAGGAAAAGTGCCA
 CGGCCATAGACCTAAGAGCTCTTCCCTCTGGTCTTGGTGAGTATAACACATCAGATAGCACATCTTGTAAAGGAAAGCTGGTTT
 CATCTTTCCCTATTGTTCAAAACACTATATGGCCCCCTCTCACAGACACATAGATTTAGACTCTGAAAGGATTATGAACCTCTCC
 10 TTGACTGGCATTCTAAGCAGGAATTCCTGGAGTGAGTTCTTTTAGAATCCTTTCAGCCTAGGTAACAGGAAAAGCGCAGAATC
 TAAGAATGCCCTTCAACCAGCCTGATTCCTATTGAAAAGATGCAATTTGTGGCATTTTGTGAGTGTGCTTTTGATTCGATTTT
 AAGAGGCCAAGGAATCTTTTGGTTTCAAAGTATCTGCTTTAGAAACATACAATTTTCTCTTAAGCAGGTGAGCTGTTTTAC
 ATTCTGAGGAATCTGAAACATTTGATTAGACAATGTTGACAGTGCATGCTTATTACGTATTTATTTATTTATTTGCTTTTCTG
 AGCAGATTAGAAAACCATGGCGGGAGGAACAAAGGGGTAGGGGACTGTTTCTGAGATTCTGAAACAAATTTGCCCTGCATCTCC
 15 CAAGAAGCTCTCAACTGGCTTATTTTGTGAGTTGGACTTGGTTCTGATGCCTTCCACTCCCATTTAGTCAAGAGGAATCTGTCA
 CGGACCACAGGAAAACGCACCTTGCTAGATGGTCTTCAATGATCTTATTGATCTTGAATAAAGATCAGCAGCAATCTCBAATCA
 TCTCTCTCCACTCCAGTACTCCACAGCCATGTTGATCCAGGGTACCCACAATTCGAAGGCATACCCCACTAAGCTTGCTCAC
 ACTAACCGCCTCTGAACCTCTCAGCTGAGGACCTGTGCCCTCTGACCTTCTAAAAGCCAGTGTCTGTTGAGTTGAGGTGAAGTC
 TGTGTTTATAAACAGCGGGGTGAGTGCATCTTTCATATGCAGAAAATAGGAAGGTATTGACAAAATAGAACAGCTAAACCATAT
 20 TCTCAAGGATCCACTTGTGTGCAACAGCGGATAGAAAAGGCTCTTGGTTCATGAGTAGTTGAGTCTTCCCTTTATGTGAT
 TTGTATGACTTTAAATAGGAAGAAATCTGAGTATGCAAGCCAGAGACTGGAGACACTGGGGACAACCTCACTGAGCAGGCTGAT
 ATGAACAAAGACCTGAAGTTGATTAGAGACTAAGCAATCACTTTCATCCGAGGCAGCTCTCAGGAGACAACAGTCTCTCTCAT
 CTCACATATGAGGAGACTCGGAGAAATGTACACAAGCTGTGACAGCCACCCAGCCCTAGGAATTCAGGATGGTTGGAGGGAGG
 GAGGAGGCGACCCACTTCAGATCACTGTTAATGGGGTAAATGCAAGTCTTAAACACAGTAGTTACATAAATGACATATGCA
 25 AACTTGAGACTATTATCATTCAAAGAGATAGGAAATTAACACAGAGTCTGAGGTGGCAGGAGGCACTGCCTCAATTAAGAAT
 ACAGGTTACAAAATATAAGCCACTGTCAATCTGGGAATGAAGGGTGGATTAAAAAGTTGGGATGATAGAAAACCTAATTTATT
 GATTACTTACTAGGTATTGAATGAGTCACTCATGAATTAAGCAATGTGCAATGCCTTAATCTCAGAACCTAGCTCTTTA
 TTACACAGCTTTTAAAGAGTTGGGGGAAGGAGGAGAGAGGCTAAGAGACATGTCTGAGGTTTCAAGCAATAGTGAAGAACAGGA
 CTGAAATCAAGCAGTCTGGCTCCAGCCTGCGCCATCACCATTGCGTTCTCTACGGCATGTGCAAGCTGTACTTAGTGAGCGCT
 30 GCATCTGCTCAGGTCCATGTCCAGCGCGGTGCATGCTTGTGTGTTAAGTCTTCCCTCTGAATGGCATCTGAATGCAGATGAG
 ACACCCCTACCCAGAGTTTCCATGGTTTCTGAGATGACAGCCTGTATCAGCATTAGATTACGGCAGGCGAGGCGCAAGAACGA
 CACACATCTCTACTCATGAAGAAGAGTCAAGTGTATATAATGCAAGTGGAGGGAAGCAGGGGAAGTCTGTCCAGAGAGGAATA
 TGCAAGGCAGTGCCTGTAAACAAATAGGAAGGGTGAATGTTCTAGGAAACGTTATTAGATAACCATCTGCGAGAGTTCCCAACT
 ACCAGGCACTCCCTTTAAACATCAGAGAGAAGTAGATCAGGAGTTACATGTCCATAAGAGAAGACTTTCTGGTCTAATTTGTGTAGA
 35 TTTAGCCAAATCCGTGATGAGTGTGTTCTGAGTGGTTCATTGAGTGTCTCACTCTTAGATCCATTGCTTCTGTGACCTTCATG
 GTCCAGGGGAGCGCTGTGGAAGGCAGGCTATAGTGTATGTCATGGCCACAGCTGCCAAGAAGCATGGGAGCCACATCTTGTGCCA
 TCCTTGAGCCTTAAAGCAAATGGCTTTTACCACGTTAAAGGCAAAATGCAAGCAAATGAACAAATTTGTTCTTCA
 TGATCTCCATCGACCTCCATATGAGAAGTCTCCGTGTGTACAGAATTACAAACGTATGCACTGTGCAAAATATTTGTTCTCATGA
 TGATAGTTTGGGACGGAAGATGTAGCTCAGTGTGAGGAGGCTGCTAGCATCGGATCCAGTACCACAAAGAAAAATAGTGT
 40 TATTGTAGCACTTACTACAAAAGTAAGTAGCATCTTAAATACTCTATTGTTAGAGAGAACAAGTGTGCAAGGCCAATTAATGTG
 CCAGCATCTGTCTAAGAAATAGACAAGCAGGAATCAAATGGTAACCGTCTGTGTAGGGAAGGAAGGAGAACCGGCAAGTGGGT
 GCTGTGTGAGTCAAGAACTAAGCCGCTCTTACTGCCAGCCACCCAAACAGTTTGTAGTTACTCACTTCTGACCGTTCAAGAA
 AAAGAGTATTTCTACCCCTGGAACAGAGCAAATTTGACTTTTGTAAAGGTAAGAGAATAGGGCTAGGAAGATGGCTCACTGTG
 45 CTAAGAGCAGTCACTGCTCTCGAGAGGATCTTGGTTTGTATCCAGGACCCACTCAGGTGCTCATAAGTGTGTAAGTGTGAG
 TTCCAGGGGATCAAAACGTTACCCCGTGTGAGCAAGGTGCACATAAATCATGTAAAGCAACACAGTAAACATAAATTTCTAAA
 TGGTCTTTCTTTGATACAGTTTGGCTTACCAGAGACACTCTGTAAGGCAGAAACGTTGTAGTTCTGCGGCAGGCGAGCTTAT
 TCGGAGGTTAATCACTTTAAGTAGAACAGAGAAGGAAGTAAGGAGGAGAGACATCTGTAGAAATCCACAAGCTTTCTCAGAA
 50 TACCTGAGCTTTGATTCGCTGCTGCTGGTTTGGTATGCTGTGCTTTATTTCTTAGTTACAGGGGAGTCAAGTGCAGTCTGAG
 CCTCTTCCATCTGCTTGCATTCTGTCAGAGAAGATGTTTCAAGCAACACGGATCCACAGGACCAATGGGTGGGGGTGGGGG
 TGGGGTGGGGCAAGTTCTCATTTGTTCAAGACCTCTGTTGGGCCAAAGGGGTGGTTGAGCAGGAAATGAATTTGCTTGCATA
 CCTGAGGACCCATTAACTCGTGATCCCAAGGAAAGAGGGAAGTATTCTCGAAGTTGTCCATTGGCTTCCACATGCTCACA
 55 CGCATGCTCAGATGAAGGTTGTCCATTGACTCCACATGCTTACACGATGCTCAGACGCCATACACATAATAGTATTATCAGT
 TACATCAGAACAAAGATGTGAAGAACTGTATTTCTGAGCTTTGCAACTGTGACTCTGCTTTGTTTCCGCTGTGAAGCTATGTTG
 CCCTCTGGGAGCCTGGGAGAGCATCAGCAGCAATCATAAGAGTGAAGAGTCACTAGCCGAGATGCTCTTTGTGAAGGCAGAC
 CTTTCCCTGACTGTGTGTCTGGAGGTGGACCTGCACAAAGCAGGGCTTAGCTTCACTGATGCACTCTCGGCGATCCTAATCAT
 60 AGCCAGTCCGATCTCCCTTTGGGAAGTTTCACTAGTAGCAGTGTAGGCGATACTAACCCTGTGCTAGCACAGTGCATCTAA
 TACTGCCTCTGAAATCCGATGCAAACTTCAGTCTAGTATTGTCACTTGCCTGATGCTTAAACTTTTGTAAATACCATAGCAAT
 CACTTGAACAGACTCAATAAAACAAAATTAATTTAATATAGCATATGAGTGTCTGCTCTCGACGCTGTCTGGTCCCTCCC
 CTTTATTTCTCTCTCTTCTCCAATATCTGGCTCCCGACACATCTAAAGCCCTCTTAGAAGTGAAGTTTGTCTCTCTCTAT
 65 CTTAGGAGTGAACAATCATGATGAAGCTAAATTAAGCAGAAATAGAAATACAGTGCCCTTTTCCACATTTGACTCTGTGTGCT
 TTTCTAATCTTTGATTCTGTTGTGAGTTTCTTTGACTCGGTTCTTTTGTGAGACAGAAATTTCTGCCAGATTCTGGGAAGT
 CCCCTCCACCCGATGGGGTGGTCTGGGAGGAGAGTGAAGCCAGTTGAGCCAGCGCTCAGTACAGGTCTGACGCGCTTCT
 70 ATTAAGAGTGAAGTATCGTTGAGTCAAGCTCCCTCTGTTTGTGACTCAGACGCTTTATGGTGCACTTTGCTGCTTCTG
 TAATGATTTCCCATGGAGAAGGTGTCTGATAGAATCCAGGCAAGACTGAAGATTGCTCTGAGTCAATGGATCTTTATCTTT
 TAGTATTAACCTTATCTCTCAGTTTCCATCTCTGAATTTTCCCTGAAGGAACCTTAATGAAGTAAACAGGCTCAGCAGCTTCA
 TTAGCTTCTTAACCACTGTTCTCAGATTCTCAGGTTAAACAGTGGGAAGCTCCGGGGGAATAGTCTGTGGTAGAAGGGGACAT
 75 TGAGAGAGAAATTTCAACAGATGCCCTGATAAGAAAAATGTAGAAAAGAGATGACATTTCTGTCTCTAAGAGGCAGCTGCT
 AATGGGAAGCAGAAAATGAGCTATGAGAAATGAATATAAATGGAGATGGAAGAAGTGACACAGAGACAAACCGAATGTGACAA
 TGGAAAAGAAAGGTGACCAATAGCAGAAAATGGCTGACCCAGAAAGATAGACAGTGTACCTGTGCCCTCAGATTGGTGGGGTGG
 GGGGGAGGAGGAGGCTTTGCCCAAAAGAAACAGAGAGGAGGAGGAGGAGAGATGGAGAGAGAGAGAGAGAGAGAGAGAGAGAG
 GAGAGAGAAGGCACGCCATCAGAACAGAGAACAAGGTACACAGCCGCTTCCCTGTTGTGCTTCTCCAGTTCCACAGTCTCTCT
 CCTCCATTGTCTCTGTTGCCCCAGCCATCACTGACTGCGACCACTCATGTTGGAGTGCCTGGCATAAAGACTCTTTCACATGAC

358

TTTAAACCTCTCTTAAAAAATAAATTCAGATATTTTGCTTCTAGCCAACTTGAGCAATGAGTATTTTTTTTGCATGTAAAAATA
TGTTTTATTGTTCTTCAAAAGGGTTTCAGGGTTTGGTTGTAATTCAGGCTGCACACCTTCCGTCAGTCTAACCTCTCTCAAGTCA
AACTGGCTTCAGTTAGCAATACCTTCATTAAATCCAAAAGAAAAGAGTTTAAATTTTGGGGGAGGAAAAAAGTCCAGTTCTG
AGAACAATTAACATTATTAGGGTTGCTTTATTCTCCTTCACACACCTTCTCCCCAGAACCAAGATGACACTATCTCAGGCAGGC
5 TGATGCTGGTGGACACCTGTCATGTGCAGACCCATGGGAGCTATTGTGCTCATGAACAAATACACACACACCAACCAAAATCTAG
CATGTCAAGTGGAAAAGGTTAAGTGGTATTGATCAAAACCTTGAGGAGTCAACAGTTAACCTAACTTTTAGGTAAGAAGTTGA
TCTTGAGTCTTTGTGAAGAAGCATCTATTGCCATGCTCTGAAGTAAAAATTTCTGGATTATATCATCATCATCTTTTCAACTT
TAACATTCTAGGAACAGTGTCAAAAGCATTATTTTCAATTTCTGGGATGAGGCAGGAAGGTATTGTCATTTAGTTAAAAATCAAA
ACAATAGCATCAACAGTAAGCAGGCACTCAGAAAGCCACCAACATCTGGGTATTATTAATGAGATGTCATCCATCTACTGGCTT
10 GACAAACCCAGCAGTGAATTTTATTACACTTCCACTGAATAACTACTAAGATAAAGTATGAAGTAAGGCTTTTGAATACCT
TCGAGGCTTGAGCATAGCTCAGTTGGCAAGTAAATGGCATGTGGGTGATAAGACCTGAGCTTGTCTGCGAACCTGTGTTAA
CGCTCTGTGATGGTGCAGATGCGGTTGAGCTGGGAAACAGCTCTGCTGACCAGCAGTACAGAACATTAGGCTTGGTCTCGCG
TACGTAAATTTAGGTGTGGCATCGAGTGCCTGTAATCCAAGCACTTGGCAGGCCAGGGCAGAAAGGAGCAAAAGCCTGTTATATATA
CATAAGAGAATTAACCAAAAAGGCAACCAAGGTGGTCCATGCTTGTCTTCTAGTGTGGGTATACAGAAACAGCAAAACCTTGG
15 GGCCTCTGGCCAGACAAATCAGTCTCTCTAGGACAGTGGGCGGGGAGAGGAGACAGACAGACACAGCAGCATGTTTGA
CTCCTTATGAACAACACTTGAGGTTGTCTTCTGGCCTCTATAAGCATGAACACACACATTAATGACATTTACATTAGATTAGG
TGGCAACGAATAGGAGTCCCCAAAGACAGTAAGGCTCTAGCCCCAGAACACTGCTTTGCGAGTTTCCAGACCATGGAGCAAAAG
AAAAACAGGCTTTTGAAGCTGTCAAGTGGACAGAGCTCAGTATTGGATACATGGTTGTGGCCAGACAGAAATAGGAGGGGGG
GGGGCAGAGAACAGAGAGCCCGAGAGGTTGCAGAAATCTCCCTTCTAGTGTCTTCTAGAGAACTGATGAGCACAAGTGTGCAAGA
20 GGCATCTCAAACTCTCAAGTCTTCTGTGGAGATAGAACTTAGTGCTTGGAAAGTCTGGGGTCTAGTGCTCTCTCATCGCCCC
AGATTTAAGCAGACATGAAGTACAGTGTCTCAGATGCTCATTGATACATAGTGAGGAATAAGGCTCCGAGACTACATGTTCTTCT
TCATACAATCTCGAATGCACATCTGAAAGGGTCAAGTGTCTTCCAGAACCTTATCCTGTCTTGAACAAAGCTTAGAACTGTG
TGTCAATACCCAAATATCCATCATAAAATTTAGTCCAAAATGTAATGACAGTGTCTGGCATCTGGCCAGATGTGTCCTAAT
TAAAGAAAGAGGAGGTTGTAGTGGGGGATCTGAGCCAGAACCCATACACATACCGAATACCATGCAAGTGTGATGTTGATTTCA
25 TGTCAAGTCGGAAGGTTAAAAATTTTAAAGCAGAGACATAGAAGACACTGTAAACACCCATGTTGGAATCTTTTATCAATCCCTGA
GGTCACATAGATGATAAACTGCATTGCTTTGAAAAGATGAATGGCAGAGTAGACATTGCTGAAATGGAGACCGTCCAGGCTGG
AAAAGCAGAGCCATGTTTGAATGAGCAGGGGTGTTTGAACCTGTAGACAATTTCTTATCAGCAAGTCTTGGGCTGTCTTAAAGAA
AAGAGTAGATGAGACAGCAAAATATTTGGCAGAAACAGTTGAGAAATGATGGCTGGAGTGTCTCAGGTGTGAAGCTCCACAC
GACCCAGACACAGGAAGGAGAGGACATCAGTGTCTCACCATAATCAGACTGCTTGGAAAGAGGAGGGGTACACTTGGAAAGTAAAGGA
30 AGGCTTAAGCAAAGGGGAAAGGAGGACAGAACTAAAGGTGCCAGGCCACGCCCTCTCNNNNNNNNNNNNNNNNNNNNNNNN
NN
NN
NN
35 NNN
NN
NN
NN
AGAAAACAAAGGCTATAAGAACTTATAAGCAAGTTAGGCAGGGTTGCAGGACACGGAGTTGTTTCTGGTGCTAGGTAACCTCAGT
GATAGAACACGTGCTAGAAATCCAGCAAGAGGCCCTGACTTAGATCTCCAGCACTCAAAAAGAAAGTATTATATATTAACAATG
AATAAACACAGTTGATGCTGTAATAATTTGAACACTTAGGTATAAACCTGAGAAATAAAATATATTAATACTCATACAGCACT
AAAATTTTATTTAGTGGAGTTTATCAAGTGAACCTTTGAAATAACTATTAGGAGAAGAGCAAGCAATGGACACTGGAGAGAA
40 AATAACCCGTATTAACATAAAGGGCTGTTGAGAAATATCCATCAGTAGATGTGAATGGCTTAAACTCGAAGTATCCATATG
GTAATATAATTCAGCAATAATATAACAACTTTTCTTTTATTATTTTAAATTAGCAACAAATGGTATTATTTTAAATAT
TTTTATTATTAAAGAAATGATACAATGATTTTATCATACTCACTCCCACTCTTTTGTATTATGGTTAGTTTATTCTTTTACA
TTTCATATACTATCCCTTTCTGTTTCCCTCCATAAACACCTATCCCTTCCCTCTCCCTCTGCTCTATGAGGGTCTCACCC
ACCCACCCACCCACCTTCTGTCTCCCTGCTGCTGCTCTCTCTCACTGGGGCATCAAGCCTTCATAGGGCTCTTCTCTCAGT
45 AATGCTGACAGGCCATCCTCTGCTACATGTGCAGCTGGAGCCATGGGTCCCTCCATGTATACTCTTGGTTGGTGGTTTAGTCC
CTGGAGCTCTGGGTGGCTCTGGTTGGTGCATATTATGTTCTTCTATGGGGTGAACCCCTCCGCTTCTCAGCTCTTCTCC
TAACCTCTCACTGGGACTCCATGCTCAGTCCAGTGGTGGCTGCAAGCATCCCATCTGTATTGGTCAGGCTCTGACAGAACT
CTCAGGGGACATCTATACCAGGCTCCTGTGCAAGCACTTCTTGGCATCAGCAGTAGTGTCTTGGTTGGTGTCTGCAGATGGGA
TGGATCACTAGGTAGGGCAGACTCTGGATGGCCTTCTTCTCAGTCTCTGCTGCACTCTTGTTCCTGAATTTCTTTCGACGAGG
50 GAATTCGGAATTAATATTTTGGAGTGGATGGGTAACCCCATCCCTCAACAGGAGCTCATGCTCTCTACTAGGATGGTCTCTAC
AGGTTCTCTCTCCCTTTGTTGAGTGTGTTGGCTAATGTCCTCCCTGTTGGATCCTGGGAACCTCTTGGGTCTCTGGCATCTGGGA
CTTCTAGTGGCTACCCATCCCCCACTGCTAACCTCTTTCAAAATTTCTCCCATCTCTAAACTGCCCCCTTTCTCTCCCTCT
GCTCTCTCTCCAGGTCCTCTCTCCCTCTACTTCCCAATATATTTTCTTCCCTCTGAGTAGGACTGTAGCATCCACATTT
GATGTGATCTTCTTCTTCTTGGATTTCATATGATCTGTAGTTGTAGTGTGGTAATCAGAGCTTCTTTGGGTAAATATACACT
55 TATCAGTGAGTGATACCATGTGTGTTCTTTGTGACTGGGTAAACCTCACTGCTCTGGCTAGTTTGTGTCACTTGGCAGAGCT
GGAGTTATCAGAGAAAAGGAGCTTCAGTTGAGGAAATGCCCTCACAAAGATCCAGCTGCAAGGCATTTTCTCAATTAGTGATCAAG
GGTGGAGGTCCCTTGTGGGTGGTGCATCTCTGGGCTGGTAGTCTTGGTTCTATAAGAGAGCAGGCTGAGCAAGCCAGGGGAAGC
AAGCAAGCCAGTAACATTCCTCCATGGCCTCTGCATCAGCTCCTGCTGTAGTTCAGTCCCTGACTTCTTAGTGATGAACAGCAGT
ATGGAAGTGTAGCTGAATAAACTCTTCTCCCTCCCAACCTGCTTCTGGTCTAGATGTTTGTGAGGAATAGAAAGCTGACTAAG
60 ACACTCACTCAGGATGATCTTCTAGTTCCATCCATTGCTATGAATTTTATGAAGTCAATGTTTATAGTAGCTGAGTAGTAGT
CCATTGTGTAATAGGACCATTTCTGTATGATTTCTTCTGTCGAGGACATCTGGGTGTGTCAGCTCTCTGGCTATTATAAATAA
GGCTGTGTGAACATAGTGGACATGTGGCCCTGTTATATGTTGGGACATCTTTGGGTATATGCCAGCTCACTCTCACTCTTA
CCCCAACTCTCTCAGATAGACTCTTCTCCATCCCTCTCAAACTATGTGCCCTCTCTTTCTTTCTTTCTTCTTTCTTTCTT
AGCCCAACCAATTAATTTCTGCTGCCATTTACCCATGCTGTGTGGCCGTGTGGCCATCTACCGAACTTGCAAGTACTTGCCA
65 GAGAATACACCTTAAAGAAAAGTACTTTTCTTCTAGGAAGTGACCAACTGTCCATAGCTCTCTCAATTATGGGTGGAGACC
CCTTCTCTCTCTATGCTAGAAATTTGACTAGCTTGTATCTGTACAGACAAACCAACTGCTGAGTCTCATGAGGATACAGTCT
GCCATGTCCAGAAGATACTGTTTGTCTGATTCTCTGCAACTCTGTCACTTGAATCTTCTGTCCCCCTTCCACCACTTTCTC
GGCCCTTTTCAAGGATGTAACATAGCTGTCTCACTGTTCCGAGCACCCTAGGACTCTTAGTCTCTGTACTTCCACCACTGTAAGT
TCTTGGCAATTTGGCCACCATTTGCTGCACAAAGAACTTTTCTGATGATGCTGTAGAGTGGCTTATCTATGGGTAGAGAGATCAA
70 GACATAGAAAGCAGTCCAGCCAAATGGATGTATCTGGAGGATATCATCTTAGTGAGGTAACCCAAACCAAAAGAAAGTATTAGA
TATGCACTCACTGATAAATGGATATTAGCCAGAAACATAGAACACCCAAATACAATTGCAAAACAGGGAAGACCAAGGGGTG
GATACTTCGTTCTCTTGAATAGGGAACAAATACCCATGAAAGGAGTTACAGAGACAAAGTTTGGAGTCAAGACGAAAGATG
GACTATCCAGAGACTACCCCACTGGGATCCATCCCAATCAGCCACCAAGGAGCCCTGCTAGAGCTGTCTGTATGAGGCTAT
GCCAGTGCCTGGCAATACAGAAAGTGGATGCTCAGAGTCACTATAAGATGGAACACAGGGCCCCCAATGGAGAAGCTAGAGAAAG
75 CACCAAGAGAGCTGAAGGATCTGCAACCTATAGGTGGAACAACAATAAATAATCAGTACCCCAAGAGCTCGTGTCTCTAGC

360

5 GGAGAGCGAGCAATGGCAGCTGGGTCTTAGCAGGATGGGCGGTTCCTCATCTGCACTGGATGGAGGCATGGCGGTCTGTAACTGC
 TCTGGGCTTCGAGCTGAGGTAGTGATGTAATGCTGCAACCCAGCCCATCTGCAGCAAGTGTCTGCTCAGACACATGCTCTTCT
 TCTCAATGGGAACAAAGACGACATCTCTCTCAGTCCAACCTCTAGAATTCTCTGGAATAGTTTCATGACATCTAGTTATAC
 AAAGTAGTCTTAGAGGAGGTGACACATGTTGCTACTTATTTCTGTTGTCTTGGAGAGCCATTTCATATGTGTATATGATTAC
 10 TAAATTTCCAAACTTAGATATTAAAGCAGATACACAAACGAAGTCATCTTTATGTATCGAGTCTTCCCTCAATGACTGTGTTAGC
 CCTACCTCATACTTCTAGAAAAGAAGACCTAAGCCCAAGCCTGTTCTCAATTCTAACCTGGATCTGATCTACTAATCTCTCCGA
 GCCTATGTGTGAGTGTGTCATGTGTGTGTTGGATTGTTGGGTTTTTCCCCACACAGATTCTCTTTGTAGCCTTAGCTGT
 GCTAGACCAGGCTGGTCTCAAACTCTCAGAAATCTGCTCTCAAGTGTGAGCCATGATCTTAATTTCAAGAAGCCCTAAAATCT
 GAAGCCCTTAACCTATAATCAAAATACAGTACCCTCCAGTAAAATGTGAAGGAAACCAGGGTATAAATAAATGTTACTAAGCCTG
 AAGTTTCTTCTCAAGTCAA

MOUSE SEQUENCE - mRNA
 15 CGAGCTGCCATGTGATGCGCATCCCCCTCCGCTGCTCTCAGTGACCCAGGACCCGCCACACGCGGCGGCGGAGGGGGCTGC
 GGGCTGGGAAACACGGGCGAGGACCGGCGCAGGGGACAAAAGTTCCCGGAAGCTGTCTGCTTCGAGAAGTGAGGGTCTGTAAAC
 AAGAAGGACCTTCAGGAGCTGCTCCACATCTGTGACATGTCTGATCCCTTGTGCCGCTCCCTGCAGCATGAACAGGTGGACATCA
 CTGATCTATACAAAGATTGCTCAGTGTGAGTTGGGGTCCATGTCTGAATGGATTGCTGAGCCTTCTCATCTCTCTCTGCCCCA
 GTTCCAGCATCTTAAGACTCGAAGCCAGGACAGGACCTGGGGAATATATGTTTGAACGGCATGTCTGTGGATGAGAAGCCTG
 GCTCCCCCATATGTATATAGTCCACAGTCCAGTGTGCCAATCATCTCTGGGCTCAATGACCAACGGAAGAAGGACATTCTC
 20 TGTGACGTGACGCTGATCTGGAGAGGAAGGAGTTCCGAGCCACCGGGCTGTGCTGGCCGATGACAGTGAATACTTCTGCGAAGC
 ACTGGTTGGACAGACGAAGATGACTTGGTGGTCAGTTCGCTGAGGAGGTACGGCCAGGGCTTTGGGCCACTGCTACAGTTTG
 CCTACACTGCCAAGCTGTTACTCAGCAGAGAGAACATCCGGGAGGTATCCGCTGTGCTGAGTTCTGCGCATGCACAATCTGGAG
 GACTCCTGCTTCTGCTCAGACCCAGCTCTGAAACAGGGAGGATGGCTGTTGTTGTCAGAAAGGACAGTGCCTGCCAGCG
 CCCCCAAGAGGACCTGGGAATCTGCAGGAGAGAGGAGGAAGAAGAGGAACATGGACTCAGAGACAGTAGGATGGCTTGGC
 25 CCACAGCCAGATGCTCCAGACCCCATCAGCTTTGAGGCCACTGCCATCCAGTAGCAGAGAAAGAAGGCCCTGCTCCTCTAG
 TCTGAGGTACCCACAGACACCAAGGAAAACCTCAGAAAAGGTGCAATTGACCCAGTACCCTAGATATAAGAAGTACCAGCTCGCGTG
 TACCAAGAATGTCTACAGTGACCCCTCAGACGGTACCTCAGGGTTTGGCAGCATTGAGTGAAGACAGTCTGGCAATAGCCTCA
 AGCCGGGCTCCCCATGGGACAGATTAAAGTGAGCCACCCAGTGAGGAGACCGAGGAGGAGCATCACCTCTGCTTGTCCGGA
 GATGAGACCGCATCAAAGACAGACAGGAGATGTGAGATGGACCGAAAAACACCCAGCCCTGCCGCTACCCCGAGTACCCGCTAC
 TGGAGCCGCTGCTGAGACAGGTCCAGGAGTGTGCTCTCGCTTCTGCTGCGGTCTCTGTTCCGATATAACGAAAGGTGTGGAGT
 30 CCACTGGCCTGCCAGTACATCTCAGCAACCTTAGTCAGGAGCTCAGCGTGCCCTTTCAACAAGGGGATCTCTCAGGGTGACCTT
 AAAACTGATTACACCCCTTTGGCAGGGAATTACGGACGCCACCTGGGCGCAGAGGATGTGTCCAACTTCGCAATGGGCTGCC
 ACTCAGGGGGCCGGGCCGGAACCTCTCTGTGAGTCTCTCTCTCGCCCTGTTCCAGGGAGCCAGATTCTTGCACGGAACATC
 AGGAACAGGGCTGATGGAGATGGAATGTACAACCAAGTCCGACCCAGATTAAATGTGAGCAGTCTTACGGAACCAATTCCAGT
 35 GACGAGTCTGGATCATCTTCGGAAGCAGACAGTGAGTCTGCTGCTGTGCAGGACAGGGGCCAGGAGGTTAACTTCTTTCTCTGT
 CGATCAGATCAGACCTTCCAGGAACGACTTCCAGATGATGATCAAAATGCACAAGCTAACCTCAGAACAGTTGGAGTTATCC
 ACGCATCCGGAGGCGGAGTAAGAACCGCATTGCAGCCAGCGCTGTGGAAGAGGAAGCTGGAGTGTATTGAGAATCTGGAATGT
 GAAATACGCAATCTGTTGTGCGAGAGGAACTGTTGTCGAGAGGAATCACTGAAGGCTGATGGAGGACCTCTTCCGACAA
 CTTTCTGCTCTCTCCAGGAGTCTGTGAGACATCCAGAGTCCAGAGCAGATCCAGGCCCTGCACCGCTACTGCCCTGTCTCA
 40 TACCATGGATCTCCTGGAGCCAGTGTAACTCTCTCTGTTGGGTGTTGAGCAGAGCCTTGACCCCTCCCGATGTGACATAGGA
 GGAAGTGTACCTGCTGCTGGAGCCAGGGCGGCTCCCGGGCTCCCTGGGTGCCAGCAACCTCTGAGTGTGATCTTACCT
 TGGGAGGAGGTTGGAAGGCAGTGACCTTGAACATTCTCAGAACGAGGACCTCCCTAGAAGCCAGGAGCCAGTCTGTGACGGTGG
 ACTTCTGCCAGGAATGACTGAGAAGTGTACAACGAGCAGAACGCCAGGAAGATTATGCCTAGCCGGTGTGATCAGCTCTGCCG
 TACCACACCCCTACCCCGGGTCTTACACCTCTCTCATCTGGGTGTTCTTCTGCCAGCCAGTGGCGCTGTTCTATCTGTGCTTG
 45 AAGAACCAAGAGCGAATTTGGTGCACTACAGCAGCTTACAGCAATATCTGTTTCAAGTATTCCCTCTCTCTCAAGCAGTA
 GTGCTAGTTACCTTATAATGGTGTACCCCTTGCCTGGCAAGGAAGACAACAGTGTGACACTGTCTGTCTGTGGGTTCATTGC
 AAATTTACAGGGATAGACTACACCTTAGGACCCAAACCGGATTTTTTTTTCTCAGTGGCCATGTCAAAACCTATCTCAG
 GAATTTCTTGAATGTTCAATTTTTTTTCTTGAAGACAGCTTCTATACACATCAAAGTTTTATAGCTATACTGTGTACATAGTAT
 ATATATATATATGAAATATATATCCATATGCAAAAGTCTGATGCTCAATTTTCTCATCCCTGAAACTGGAAGCTTCACTTA
 50 TCATTTACAAACAGGTTCCAACATTCTCTTTTTGTGTCTGGTGCCAGAACTGGTTTGAAGCTGTTAACATGGCTGTTTTGCTTG
 CTGCACAACTTCGGTTTCCATCTGTGCTTATTACAGACAAAATTCAATGTTGGGAGATGCTTCTCAAGTTCAATCTCAGACCTTT
 TACTTTCTGTTGGTTTGGTTTGGTGCCGCGAACGGTGTGTCAGGTGAGCACCGTGAGTCCGCTCTTCTCCCTTGTGTTTTCCCTC
 GTCTCTCGGGTACTGTACAGCAATGGTCAACTTTGCCACTTGCAGTGTGTTGAGTCAAACCTATTTCTTAAATGAAGTTGTA
 ACTTCGGTATAACTCAAGTATATTTTTCGTTCTTTTCTTTTGGAGACAGGGTCTCACTATGATAGCTAGGTGGCCTG
 55 AAATCTGCTAGGTAGACCGGGCTAGCCTTGAACCTAAAGAGATCCATCTGCTCTGCTCTGCTCTGAGTGTGGGATAAAGAG
 TATGACACCACCATGCTGCGAGTCCGGGAATGCTACCCGTTGGCCACCATGACATTAGGTAGGAAGACGCGGAATCGCTCTCT
 TCTGGCGCTGAGGGTCTCACTGAGGAACGAACCGAGATGTTCTACACCTTCTGTGCTGTAGGAAGAGAACTCAGAGCTGCTT
 CCAAGGCTTTGACACTGTGTGAGGGCTAGAGGCCAATGGTATAGGAGCGGCGGTAGGGTTGTGAATAGAAGAACAGACGGGGC
 CGTCACCGCCCACTCGTACCACACTTCTTGGAAATTGCTGATCGCCAGAAACGCACACAGATGTTCTGGCCTTCGTGACCGGTGA
 TGGGCTGCTTAATGGGAAGAAGATGGGAACCATGAGAACATTCAGGAGAGTGAGTCTCTGGGCGGATACAGAGTGATGTCC
 60 CGGTAAAGCAGCTCAAAAGTAGCTCGGAAGCCATGAAGCACCGTGTACCTCCACAGGAACTCCAGGTCACAGTACAGTGGT
 GTTGTCAATCATAGGATCTCGGTTGGGATGGCTGAAGGTAAAGCAGGGCTTAGGAGCAGAGAGCTGGTGAAGTTGTGCAACCGAA
 CCACATAAGGCATCTCAAAGTGTGCTCAGGATCGCGGTCTTTTCCGACAGGCACGGACCTCGTTGTACAGCTTAGAGGAAGAA
 ATGGAGGCCAGGAAGGAGGTGATTCTCCAGGGATGCTCAGCCATCATCTTTAGGAAGTGTGTGCTCCATCCAGACACTCAGG
 65 TGACAGCTCGTTGTGCGCAAGGAACCCAGAAGCTCACTGACAATAATGTGAGCTTTCTCCGAGCCACCCATCCCGCATGTCTG
 ATGAGACAACTGTACCTGGCTCCCCATTTCTCAAAGTGCAGTCTCTAGCGTCACACAGCATTGGGGTCTTCTCCACAGCA
 TACAGCTGTATCCGCGCTCGGCTGTGTTGGCTGCCGAAAAGACGCAATCACAAGAGGACCCCGGCTGCACCCAGCACCATAAG
 TACCTGGACATTGGTCTCTTTCTTCTCTGCTACTCGGTCTAGCAACATTTATAAATAGCTGCTGATATTGAGAGTATTGTA
 TGGGTCCTTTTTCAAACACTTATATGTCTGAGATTCCAGATTGTCCATCAGAGGCTGGAGTGGGAGTGCAGATGCTTTCATAG
 70 CTTTGGCAAAAGCTCATAGGATTGGGTGGAGGGGATTTGGCTTAAGTATTCCAAGTACTGGAGGTAGGAACAGAACTCTT
 CTCTGAGTGGTGGTTGGTTCCCGTGTATGATAAATGCACCTTCCAAGTGTAGGAGCGGAAGATCAGCCTCTGTGACCTTAGAAA
 GAA

MOUSE SEQUENCE - CODING
 75 ATGCTCTGCGATCAGAACCTGGCTCCCCATGTATGTATATGAGTCCACAGTCCACTGTGCCAACATCTCTGGGCTCAATGA
 CCAACGGGAAGGACATCTCTGTGACGTGACGCTGCTGGAGAGGAAGGAGTCCGAGCCACCGGGCTGTGCTGGCCGAT

362

TCGCTGCTAACCATCTCAATTCTCGCACTTTCTGCTACTCCAATTTCTGCTGGAATGACCTTCCAACATTTCTTTTTCACAAAA
TCTCATCTCTCAGAAATCCAGCTCTGTTGTGCACTCTCTCCAGGAAGCCATCCACATTTCTCTAAGCAAAGTCACTTGCCAGAAAGAC
TTTTGTCTCTATTAGGCGCTTAGCATGGTGTGCTGTGAGGACTTCTTCACCGGTTCACTTCCCCACTAGTCCAGGAGCCCTGACT
5 TATGCACTGTTTTATCTCCAAAAGTTAGAAATAGTGTCTAGTACATAGGTTGTGTATGCTCGAGGTGTGTCTGAAAAAAGAAAAACA
GGCAAGTAACAGGTTACAAGGTCTTGCCCATTTGGGAGGGGAAAGAAAGAAATCTACATTTTGAAAAAATGAGTCTAGTACACAAT
GGCATTTTGTACCATGTGACTTCTAGTACTCTTGTCTAGCCATGACAGCAGGCACAATCCCCCATACCTTCCACTTCTGACCTATC
CTTCTGACATCACAACTCTCACTCTTTCCCAACTGCAAGATATGAATGCTATAGTCAGATGAAAGTGTAACTCAAGGGGTC
10 TAAAGTAAAGTCCAGCCACCTTCCCTCTCTGACTCTTCTGGCCTTGAGGTTCAACTGAAATCCACCTTCTCAGTG
AAACCTTTTCTGGCTACTTTAACCTTCATAATTGTTTTCTCTTAACATCTACAATACTTAAGTTCTGTTAGAATTTAATTAT
GCATATTTTGAATTTTACAACATTTATGGCTACCTTTATTACAGAAGTAATATATTATATTACAGAAATTTTGTAAAAAGCA
15 AAGATAAACCACTTATAGGCTCTTTATTTCAAGAGAACCCTTGAACACTGTGCATATAGCCTTCCAGATTTTCTCTATGCATGC
ACTGGCAATTTTTTTTTCACAAATAGGATCCTATTGTAATAGTTATACAAATTTATGTTAACTATACTAACAAAAATTAATATA
TCAATATACATAAAATTTTCACTAATTTTTCTATTATTTATTTTGGTAGAGATGGGGTTTCACTATGTTGTCAGGC
20 TGGTCTCAAACTCTGAGCTCAAGAAATTTGCTGCTTCAAGCTCTCAAGTGTGGGATTATAGGCATGAGCCAGCGTCCCGC
CACCATAATTTATTTTGTAGTCCATGATATTCATATTTATATATGAACCACCATTTATTTAGCCAATCATTTCTGTGAAGCA
TTTGGATTTTTCATTTTCTTTTGTCTATACATAAAAAAGATCTGTACATTTCTAATTTTTTCTATTAGTATAAATATAACACAT
ACAATTTCTATATAATTTTAAATATTAATATATAAAAGTAATAAAATCAAAATACAAATTTCAATTTTCAATTTGTTTCAATGATAT
25 TAGTTTGTACTCTTATGTAGATTTAAGTTCTTAAAGGATACAGTCCAATGTTTCTTAATTTTCACTCAACATGTAAACAGATGC
TCAGTAGTGTATGTTGAAAAATTAGTTTATTTTATATACCATATTTTACTAGTTTATTTTATATAAGCTTTTATAGTAAATAGTGGCA
TCAATTTCTTACTATAGAAGAAGTCACTATAGATAGTAATAAAGAACATCACTTTCTTTAGGGACTATTTTCAAAAGTCTCTT
TAGGAATGAGGCAATCTTTGAGGAGATGAAGATGGGACAGATAAGAGATATACAGTTTGAAGGAAAAAGGCTGCCAGCCAAATTT
30 AACAATAGCTAGAAGCAAAATTTTGTCTTTTCTGTTTGGATTGCCCCTGATCAITTTTCAAACTTGTGTGAGATTTGTACAATG
AGAAATCTCTTCTTGGCAGTGGTGTCTCAGAAAGCCCCAGGAGTGGGCCCCAAGGCTCTCTGTGCGCTCCAGCAATTTCTGCCA
CATCCCTGGCAGTGGTTACATCTTTCTATCCCTTAAATCTTATCTTCCCTCTCCACTATCAGTGAACGGCTCTATCTTTCTTA
25 CTCCACTAAGAAAACAGAATTTCTCAGACAACGGCTTCCCATACTTCTACCATGATATCCAGCCTCCCTGCACTTCCCACCTG
TGCTGCCCTTCTCTGTGTGGTGGGATGAAGTGGCCCCCTTCTCTCAAGGAAGCTTCTCAGCTTCTTGTGGGATCTTTTTT
TCTTCTAGTCTGCTGACCTCTAAATGTGGAGTGGCCCCAGGCTTAAACCTTAGACTTCTTCTTGTCTGCTTCTCCACCTG
TTTCCAGTTGTGTGTGATGACACAGATTCTATCTCTAGTCTGGACTTCTCCCTAAATTTCTAGATTCCCATGTCTGATTAC
30 CTGCTCAGCTTTTCCACTTAGATGTCTGATAGACATCTGAAATGTACTATATCCAAAACCAATTTTCTGAGATTTCCCCCATACC
TGCTCCGCTGGATAAATGAATCTCCATTAAGCTGTTCAGTCCAAATTCAGAAATTTCTTTGACTTCTCTCATATCTCA
CAATGGAAATCATCAACAAATCTGTCCGGTTTATGCTGAAAATATATCTGGATTCCATTTATGGCTGTCTTCTAGCTTCTATTA
ATAGTTTAAATCACCATCAGCTCTCTAATGACTTATCTCAATAGCCTCTACTTGGTCTCTCTGCTTCCATTCTGTACTTCCCGT
35 GACCCAGCAGAGTGTCTTTAGGAGTTGAGGCCAGGACATGTTCTTGTCTGAGAAACCCCTACAGCATCCCATCTCATTCACT
TTTTGTGAGATTTCTTGGATGTTAAATTTGCGCTGCCATGCTTTATCAAGGTACCAATTTGAAATTTCTGTCTACTTCTGCT
AAGAAAAATACAAATTTTCTCAACATCATCAATCTGTACAGGGTGTGGAGAGCAAGAAAAATCAAGGCTCAAGAACTGCC
40 ATGCTTTAGTCCGCTCTTCTTCTCATCTGTTTCTCTGTATATTTTAAATTTTCTGTTTATTTTCTACAATCAAGAAGATTTCT
TATTATAGAAATAAAGTTTATTTGTTTCAATGCCATGATACAGATTTATGTCCCTGAAATATCATGCTTAGAAATGAATCAG
ACAAAGCCCATGCTCTGGATCAACACACATGTGTAAATATGTAGGAAAAAATGTATATCAGGAAAGGTTGAATGTCTCAGGCATG
45 AGAAATAAATGACCTCCACTCACTTACTGCCATGATTATACAGAGGGAAGGACCTGGATCTGTTTACATCATAAACGCTTAA
TTGCCAGAGCAGCAAGCCAGGAGTGGCCATGCCAACTCATCTAGGAGTGCTAAGGCTGTCCACGCCAAGCTCTGCCAGCAG
TACTGTTAAATGAGTGTCTAGTACTTGACTTACCATTTAATTTACATAATTTCTGAATGTATTTTCTGGCTTGAATTCAAATAAC
50 CCATCTTCAACTACCGAAAATAAAGTAGAAAAATGAATCACTACAGACTTCAAAGCTTATCCAAAGCAAGATTTCTGCTTCA
GCCAGAGTGATGATTGAGAGTGGATGTAACCTGAGAGGCTAACTACTCTAATTCAGCCTCCTTGAATGACTGGATGACA
ACCTATCACAGGTGTTTTAGGTTTTTCTATCTTATTTAATGTCCACCTCATGCTTGAATTTCTCAAAGTGAAGAAAGCTCCAGTC
45 TGAATCTTTGGGCAAGCAGACTAAGTGAATGACCTGTTAGCTTCTGTTGTATCCATCTGACAAGATCAGCTTGTGAATTCAGAA
TGGAGGTGGGAGTCACTGTCAGCTCATTTCCTTCAACACCCCTACGCTGATGTGCCCCAAGTCCATCAGCTGAGGAGT
CCACCGCTTGTCTGAAATAAATGAATCTACACCACTCTCATACGGATGCTCTCAAGCATCCCTTGTGTGAGAAAAACATTTAT
55 GCTGCTACTAAATGCGTAAAGTTATCTCAACACACATACTTACAAGAAATGAGGAATGAGAAACAGAACCATCCATAAACTATA
AGAAACGGCTGCGCCAGGCGAGACAGGAATAGTACTGTGCTTCCAGGGGTGAGGAGGAGCTCAGAGCAGGCTGTTTTG
TCTTGAAGGGGACAGAGCAGAGGTGAGGAGTCAAGGCTTCTAGCTTCAAGGACTTTTCTTATCTGAAGGCGGGTGGT
50 AGCAGAGAAAAATCTCAGCTCCGCTGCCAGACCTCCACGAGGAGTCTGAGTGTGTTAGAAAAATAGCTCAGCACCTTCAAGC
TTGCTTTTCAAGCATCACTTAGCTTTCCACACAGACATTTCAAAATGGGGCTTTTCAAACTCTGCCCCCAATGAAGGTAGTTTCA
GCAACATTTTAGATGATATCAAGACTCCAGGAGCTTCACTGCTTCTCAGCATACGCGAGTCCGCTTTCAGGGGGGAT
TATGATCTTCTCTCAGTAGAGCGAGCCAACTTTTATAATATTCAATAAATCAGCACCAGTGAATAATATGGAATAGTCC
55 TGTACACAAGAGGGCAAGTTATAGGTGTTTAGGGAACGTTGGCAGAAATTTTGGGCTTGGCAAGAGGTAAGTTGACGACCA
GCACAACACTAACACAACCTTATTTTATGCAATGTACATTCAGCCTAAATCTAATTAACCTTCTGTAATAATCTTAACCAAC
AAGCTTTCTTCTGACAGGCACTCACACGAGGCTTTAAGGGCAGCAACAATCTTAAGAGCCGAGAAAGGAAAGGAGGAGG
60 GAGTGGCTGGAAGGAGTGGAGCTGGGCTGAAGCCCGGAGGTTGGCTTTTATGCTCTCTGAAATTTGACCACTCTCTTTCCA
AAAACATGCTTGGGGGCTTAAAGGTTCTGCTCAGTAGGCGAGGAGGCTTCTGAAAGGATTGAGAAGTCAACATTCAAAA
GGCTGCTTTTACTCGCCCGGTCCTCCCAACCAAGGAGTCCGCTCAGCTTTGTGGGGGCGAGTGGAGCATTTTTCTGCTTCC
65 GGGAAAAAGCTAGCTAACCTGGGATCCCCGGTCCCGAGCTGCTCTCTTCCCAAGTGCAGCACCTAGGGCTCTGGCCCCCTC
CCCAGTGCCACACAGCCCTCACCCTACTCTCACCCTGCTATGCCCCCAACCTCTGTTTCTGTCGGCGGAGGCGAGGCGA
CGGGGGCGGTGAGCGGGGCGGAGGAGGGGCTCTCCGGGCGCGCGGCGCAAAAGCGGGGAGATCTGCTGCTGCGGCGGAT
70 GGAGGCGCGCCCCCTCCCGAGGCGAGCGGAGCGCGCGCCCCCGCCCCCGCCCCCGCCCCCGCCCCCGCCCCCGCCCCCG
CGCGGAGCGGCTTACGCTAGTCCGCGGGCGTACCGCGCCCCAGCGGCGGGGAGTGCCTGCGCGCTCCCGTAAAGTTATTGT
AATGGGGGAGCGGGTACGCTCAGCGCGAATGTCAACAATGTAGCGATTGAGAGTGTGGCGGTTCCGGGAGAGCGCAAGCGCGG
75 GCGCGAGCAACAGCGCGAGCGCGCGCGCTCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGCAGC
TGCGGTGCGCAGCGCTAACGTTAGCGGCGCGCGCGCTCGCCACCCCGCTGCCACTTCCCGCGCGCGCGCGCTCTCGCTTTCC
CCCGCTCTCCCTCGCCCTTCCCTTCCCTTCCCGCGCACTCGGGGGGCTGGGAACGAGCTGCCATGTGATGCGCGTCTCCCT
CGCGAGCTTTCTGTTGACCCAGAACTGCCCACTCGCGGCTGCGGGAGGGGCTGCGAGCCGGGAAGACGCGGGGAAGAGGAG
CGGAAAAAGAGCAAAAGTTCTCGCGGAGGTGAGTCCCGGGCCCGGGCCCGGGCCCGCGCTGGGCGGGGTGGCGGGCAAGT
70 TTGCGGGGAGCGGCGCGCGGGCGGGGAGGCGTGGGAAACGCGCGGGGAAGGAGCCCGCGCGCGCGCGCGCGCGCGCG
CGCTTCCCGCGCGCTGCGCGCTTTATGGCATTCTTAGGAACGGGAAGGGGTTGGGAGCGGAGCGCGCGCGCGCGCGCG
ATGTTGTCTCTCTCTCGGCTGTTTACGGCGCGCGAGGCGATTGTTATTTGCTGCGCTCGAAGGTTGTTTGGAAACAGCAGAGG
75 GAGGAGGAGCAGAGAGTAATAAGTCAGGCTAGGAGGCGGGGCTGCAAGGCGCGCTCCGCGCGAGCGCGCAGCTGTGAGA

CCGCGGCCCTGCCCGGCCCGGCGAGGCCCGGGTGTCCCGGCCCCAGCCTCCGATCCAGCTCCAGGCCGGGCGGCTCCTCC
 TTAACCTTCGGCGTGGCATCCCGGGCTGCTCCGCGAGGACCTTGGCCGCGGCGCTTGGCGCTCAGCTGTGAGCGCGCGGGT
 GGCCCGGACCACCGCGACCGCGGGAATCAAAGCCCAAGTTTAGGGTCGCGAGGAAGAGGCGAGCTGGGGGCTCCGCGCGCAGAC
 CTGGATCGAATCTCTCTAGCGAAGATCGGGTGTGCGGAAGCGTCCCGGTAGCTAAGACCTAAGGGCGCCAGGCTTCTGAGAG
 5 GGAACCTTGCACCTCTCTCCACAGATCTCCATGAAGTCAAGGTGCAACACACACACACACACACACACACACACCTACA
 CTCCAGTCTCAAGCCCCAGAAGCTTACCCAGGAGACTGGTTTATGAAGGGGACACTGCCCTCCCGTCCCGCGCTGAGGCGCT
 CCGTGGCCCCGCTGTGCTTCCCTCACCOCGGGGTGTTCGGGAGCCCGCGCGCTGGAGACGGCGGGCGGGCGCTCAGGGCT
 ACCCTAGGTGCCACGAGGGGAGAGACTGGAGCGAGCATCTCGGCGACCTCGGTCTGGCCAAGCATTTGCAGGAACCTCGGACCGTG
 AGGGGAAGCGTGCAGGGCGGGAGTGAGTGTGTGAAGGGTGGCACACTCTGGCTTCTGGGGTCCGGGGCGCATGGGGCATCCCC
 10 AGCACTCTCCGCGCTAGGCGAGTTTGGTAACTTGAGGGAAGTTCCGGCGCGGCGCTGCCGGGGTGGTTTGTCTGTGGCCGAT
 GAGGCGCGCTCGCAGCTGCTCTCCGGTCAACCGCTGCCGTGACCTGTGGCTCCAGGAACGAGAGGACGGGGCGCCCC
 ACCCGCGAGACGGACCCGAGTCTCCCGCGGGCCCGGGCGGAGACGCGGCTTCTGGTTTTACCTTTCGTGTCTAGTGC
 TGCAGTCTCTCACTCTCTGTAATTTATCTGTGAGTGTATTAACTAAAAAGGTAATTACTTTAGATAAAAACTCTTCTCTGC
 CTAGTGGGAACCTTGGCGGAGATGATCCCTAATGAGATATTTGCTTTTGTCTGTTAGAGTAAATAGAGATGTTAACGCTGAT
 15 AACGGTTTTCTCAGATCATTAAATGTAACTGTAGGAAGGACAGTCTTGTGCAAGGCTCGGGCTGACATGAAGACCTGAG
 CGTGAAGGCTGCCCTCTTGGCGGAGAGGCTATTTGGTGAAGGCGAGGGCGTCTTGTCTAAATGTGAGATCGCCCCACCC
 TGGTCTCGGGCAGCTCCCGAGTAAACGGGTTTTTCATTCTTGCAAGTAATAAACGAGTGAATGACATCTTGTAGAA
 TTAGTCTTTAGTCTGTGAAGAGATTGCCAATTAACAGTCTGCGTTCAAACCTGCTCCACTGAAAGGTCTGTGAGCACTTCCATTA
 TAAATTCAGTTTTCTGGAGTTTATAATTTACCACAAAACCTTGAAGTGGTGAATGTTTTCCCTTCTAGTATTCTGGTTTTTGA
 20 AAGAAATTTATGATGGCCATTTCCAACGTTTTTTTACTCTCGAACTGAATATCATTGAAATAGAGCGAAGTCCAGAAATG
 GAACCAACAGCTGAATGAATTAAGTATTTTGTGTAACATAACTTTATTTGGTGAGAGCCGATTTTCTGTTTGCATTGAGGAG
 CTTGAGTTTTGCCATTGGTAATCATGAATGTGTGAGTAAATCTTCTGCTGTCTGCTATTCTGCAGGTGGAAGTGAATGTCAG
 TTGGTAGTGTGTTTGGCAGGATTACATGGAGACACACTTCTCAGTTAAGTGTGTCTGAACTCATAGCTAAATGTGAACAT
 25 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 30 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 35 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 40 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 45 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 50 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 55 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 60 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 65 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 70 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 75 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG
 CTTGAGTACTTTTTTGGTCTTGTATGTTGATGTGAGTCTGCTATGAAGAAGAGGGGTGAGGTGAAGAGAGAGGG

ATCATTAGTGTGAGTGTATTTATGTGTGGCCCAAGACAGTTCTCCTTCTCCAGTGTGTCCAGGGAAGCCAAAAGATTGGACA
CGTCTTATTTAGACCATTCCTAGATGCAAAATTAAGGAATTTTGACAGCATCTATTTAAATAAATTGATTATACCTCATGTCAAC
ACCCCTCTATTTCTTTCTTTCTTTGATGATAGTTAACTGTATTGAGAGCTTCTCTGTGTGCTGCTCATATTAACCTCACTAATCC
5 TCAGAACCAACCCAGGCTAGGTGTGATCAGTAGAAGCCGAGCATAGGTGTGCTCAGCTAATGAATGGTAGAAGTGGAGTGGAC
ACTAGCTGTCTGATGCTTGGGCCCTGTTCTCTTACCATGTTATGGCTCTCCCTTTCTCTTTCTCTTCTTGAAGTGGAACTCT
CTTTAGCAGTTCACAGAAGTAGAAATAAGGTCACTCACTCAAAAATATTGGATGTTTTGTTGACATCTATCTTAAAGTTAAAA
ATAATTTCTCAGTAAATCTGAGTGAGTATATCTCTGTCTTTACATGGCCTGCTTTCTAATAATTGGATTCTTAGGTTTATGTG
10 TCCATTTAGGGATCGGAAAGTAAAGTGATGATATAAAGGCAAAAGAACTAGGCAATATACTGAAATACCATGGCTCTGTCT
CCAGGGTTTACTTGTAACTCAGCTCTTACCCTCTTGTAGGTGGAGGGAATTTGTTTTTGGCTTTGTTTTTGTGTTTTGTTT
TTTTGGTGGGTAGGAAAAGGTAAGGTAATACCTGTAAAGGTAGAGTATTCTACCAAGGAGGAAGATGTTCAATCAGAACTAAT
TCCATCAGAAATCCTAATTAGAAATATTAGCTACAGTAACAGATAAAGGAGGTAACTTTGTCTCATTCTGGTCAATTTAGG
AAGAGTATCTCTGCGAGATTAGCATGTTGCAACTCTCAGCTGGAGATTGAAATGGTTTTAAAGGACTCAGGCAGTTGGTATGGCA
15 GTAAACCCCAATTACCTCAGGTTTGCAGGGTCACTGTTTGAAGTCTGACTCAGCTCTGCCTGGGCCAGACACCGAAGTTGTCTATC
TTTAGTCAAGAAGCATCATTCTCAGGAGCCACTTGAACATTAAAGCACACATTTGAAGCTCAATTTGGGAAATGATCAAGTGTATG
AATGTATAGTACTGTGCTTATTTTTCAGCATTTAGTTCAAATTTTGGAGAAAGCTAAATGGGAGATGCTTAGTGTGTGAGTGTGG
AGGTTTAAAGTGATTTAAAAAATCAAGCAGATGAGTGATATAAGATTCTATGCAACAATGTGAGCTTAAATTAAGCTGTGTA
TTTAGTGTGAGAAATTAATGATTTGATTTGTAGAAATCTATGTGGGTTCAAGATTCCATATTATGCAAAATGAATAAGCCCTGAAG
AGTCAAACTGAAAAAATAAGAAATTAACGTGTGAAGATATTATTACCCATTGAGCAAGGAGGAAATGAGACAGAGTTAACCCCT
20 CCTTTTCATACATTTTCTGGGAAGATAAGTGCCAGGATGATGGTCCGTGCTCCAGATGTAAAGAACTAGGCAGCGTTTGGAGC
CAGTTCCCCCATCTCTCTGTGCTCACTTTTGTGTTCTGCTCTCTTACCTTTTGGCCACCCAGTCCCTCAACTAGTCTCTG
TCCTTCCCTTCCAAAACCAATCTCAGAGAAAGATTATGAACACAGTTTACTAATATATAAGTAACTGAGCATCTTAATGTGT
TACTTTCTGAAGCATCAGCATGTTAATAGGAGACAAAGCCAAAGAAAGTAAACCCCTAAAGATAAAAAACAATAGAAATTTCCGACAC
TGGTAACTGGGTGATAGGAGACCATTTCTGAATGGAGAGAGGCTCGTGATAAATAAACCAACACCTAGGCAGAGAAATAGGCA
ATGGATTACAGTATTTAAATCAAGTAGTATTAATAACAAAGAGAAAGATTATTTTAAATATACATTGTGAGTGGAGATTCCCC
25 GCCTTTTGGCGTACATTGGAGTTGATCACATAAACCCTCTATAGCAAGATGGTATGTTATTTAAACATTTAAACAAAGCTTCCAGGGA
AAGCCATTTGGTTTGTGGTTAGGATTTTGTATTCTAGTAGCAATGAACCTGAAATTTCTATATTCTTTGATTTGAAATTTTA
GAAGAAAAAAGCAGCGGATCCAACTTCACTTACCTCCCAACCCAGTTGCAATTGATACAAATGAATTGATAAATTTATTTCA
AAATGGTGTGCTCCCAATTTGACATACCAAGCATAGTGGTGTGAGCATGGTGGTACATCTGGACATTAGGAGAGTTGGTTGAT
TAATTAACCTATCTTATTTAGATAGAGTTGTTGGCAGGTAAATACCTGGCTGTAGAGTCAACGCCCTTCACTGCCCTCTCC
30 CCACCATACCTTCTCCAGCAACCATGCTATGTGAGTTGATGGCTCCATCTAGTCCAGTCTGTGGAAGTGTCTTGCAGGACTTC
ACTGTCACTCCAGAGCTGGGTATGATGAAGAGTCTCTTCTCTGGGAACACACTGTCTAGCGGGAACTGCCCTCTAGTCTCTTA
CCTCTCCTTTGTTTGTGAGTTTGTATATACCTCGGTCTCTTCTTGTTCAGACTTAATTTGTTTCCCTCTCTCTAGTACCCCT
TCTTTGATCTGTTTCTCCTCTTTTGTGTTTCCAAGTCTCAATTTTTTTTTTGGAGAACAAAACAGTACTTAAACCCGTAAGT
ATAAAGATTTTTTCTAAACAATCTTTATGCAAGTAAGGAATTTCTATGCAATTTAAATGAACTATCAATTGAAACCATGTT
35 CTCAACACAGTTAATCAAGAGTATTTCTTTTAAATGGTTTGGAACTATCATTGTAGTATCATTCTTTTGTAGATTATAAAT
TAACCTCTCATATTTTAAAGTTCAAGACATTTTACGGACTATCAAGGAATCTAGCTCATTGGCCTGGCCCTATTTCTGTGGGAAA
ATGTATTCTCAGTCCAGACAACCATGTTCTGCGATTTTGTAGTCCCGTATAAAACGAGAGAACATAGATGAATGAGAGCAT
TGTGAGACAAAGCCTGGCAGATGAGATCTCAATTAGCATACAGGTTTAAATTTCCACATTAACACAGTACATTTTAAATTTCCAC
40 TTATGTTAAGCGTGTGATATTGTGGGTTTGAAGTAAGTCCCTCTGAAAAACAGGAACGTGTGCTGTCTGTATACAGTTCTGT
GGTGCATATGGTAACTATTTGATTTTTCAGAAAGGAGGAAAGCAGTTAAATCTAGTTAAATTTAAACAGTTAAATTAACCT
GCTCGTGAGATTCTCAGTGAGCTGTTCCACACATAGCAACATCAAGAGTGTGTTAGTATTAATACCATGATTAAATTTATGTTGT
TACTTCTTTTGTAGCAGTGGCATAGATTATTTATATTTTGTCTAACCTTGGAAAAATAGAACTGCAAGCGTAGAGAGGTTCCCG
TTTGCTATTTGATGTACCTCTGTTTGTGTTTGTCCAGGTAGGTGTGCTCATCTCAAGTACACGAGAGTAAATTTAGCATGTGAG
45 ACTTCTTACCAGCAGTGTGCTGACTCATGCACTGTTGTAGCACTCAGCTGGCCGCACTGTAAACTGCCCATAGTACAGCAC
CGCCCTTGGAGAGCTCCGGGCTGCTGGGCTGTTAGTACTGGGAGGCTATTTTCAAGTCTGTGCTCAGTCTGAGCTGGGCTCCTC
TTCTCTGCGAGCAGCAGACACAGCCTTCTGGTTGAGGGGAGGAAATTTGACAAATTTCTACCTTTGTAGGGATGCTAATAAG
TTCATAGCATTTCTGGATATGCTCAGGAACTTTTGTGCTTCACTTTATTTTCTGGGAATATTAAAGGGAGAGGCAAAA
GGGGCTGATAAATAAGGAAAGGGAATGTGCTGTTATTTCTACTAAGATCAGAAAGAGTTTTCATAAACCTTTAACTTAGTTAGG
50 CTTTCTTGGCGTAACTGAAACCTGACCCACTTCTCCCTCAGTGCAAAGCAGTGTGCTCAGTAGGGAAGCAGGGGCGAGGGTGA
AGTACTAGCCTGACATTGTTTATGTGGCTGAAGTCCCTAAGTGATGACAGCTTTGTTTATATCCGTTCCCTGTTATGAGGTT
AAAAACAAACAAACAAACCTTGACCTCAGGTCACTTTTAAAGCTAGCATGTTATTTTCAAGATGGTTTCACTGTTGTTTTCAGAGT
TCAGTTTGTCTATTTTTCATCGGAAAGTGTGAAATGTTGCTTTTCTGAGGCTTCTAAATAAATCTCCTTTGTAGATACAAAGTTGA
55 TCCAATCATATAAATCTGTTGAAAAAGGATGATTAAAGTAAGTCAAGTGGGGAAGGGAAGCTTTGCACACCTTTGAGGAGTT
GATTTTGGCCCAAGTATAAAGTTGTTTTGTAGGAATGATGATCCCCCTGTTGTTTCTCATCTTACTGTTTTAGTTTATGTTATG
ATTAAGGAGCCAACTCAGATCATTTCATCGTTTGAAGATCTCTGCGCTAAGCATCTCCTGTGCGGGCTGTGTTTGGGGAATGT
60 GGCTGAAAGCAATCTCCTGAAATGCAAGAAAGGAAATCTGGTGCAGACTCAATCTCACTGAGCTGCGTCCCTCTACACAG
ATCTATTGCGGAGGCTGTGGTATTGCTAAGTAGCCCCATAACCTGTGAGTCAATGTCAAAGGATTCAAAGGAGGTTAAACAG
AAAATGCGAGTCAGAGGAACAGCAGAGTGGAGCAGTCTAGCTCAGGAAGAACTGTGCTACCTGCTGAGGGGCTGCCAGATGTCAC
CAGGAATCAGGTGTACGTTTCTTTTGCAGCCATTTCCGATGTCTACATATGGGGACATTTTGTGTTTTGTTTGTGTTTGT
65 GTTGGTTTTGCTGAGTTTGGCCAGACTATCAGAGATCACTATCTTAGCTTCTGATCACAGTGGTCTTATCCAGAGCCTTTGCTT
TTTGTATTTTATAGTCAAAGCACTGAATTTCTAGACTGTAAGACCAACATGTATATTTAACATAATCTTTTCTTTCTAAGTGC
TTTATTTATTTATTTATTTATTTATTTTATTTTGTAGATGGAGTCTGTGCTGTGCAACCAAGCTGGAGTGAGTGGTGGCATCTCGGC
CCAGCTAATTTTGTAACTTTAGTAGAGATGGGTTTCACTAGTTTGGCAGGCTGGTCTCGAACTCTGACCTCAAGTATCTGC
CTGCTCAGCTCCCTAAGTGTGGGATTATAGGTGTAAAGCGCGCTGCTGCGCCAGACCTAAAAAATCTTATAAATAGTTCAA
70 AAGTTAAAAATGATGAGGAGGCGGGGTGTGGTGGCTCACGCTGTAATCCAGCACCTTTGGGAGGTGAGGGCGGTGGATCAGCA
GGTCAGAGATCGGGACCATCTGCTAAGGAGGAGGAACTGAGTGTGCTCTAGTAAAAATACAAAAATTTAGCCGGCATGGTGGCAG
GCACCTGTAGTCCAGCTGCTCGGAGGCTGAGGCAGGAGAAATGGTGTGAACCCAGGAAACAGAGCTTGCAGTGAGCCAGATCGC
ACCAAGCACTCCAGCTGGGCAACAGAGCGAACTCCATCTCAAAAAAGAAAAAAGAGATGAGGGGCTTTTCACTTATTG
75 TTGGAAAAAAGGTGAGTAGGACTCTGTGTTCACTAGGTGTAATCTGGAGAAATGAGAAAAACAGCCCAAGTGGTTTAAAGACGTTT
GTGGCACATAAATAACTGGTTGAGCACATGTGAATCAATAAAAAAGCCAGATAACCAAAAAAGAAATGATACTGTACATTC

ATATTCTTAAACATGCATTTACAAAGGAAGAAACCCAAATTGGCTAGTAAATATATAAAAGATGCTCAGCTTCATTAATAAACAA
ACACATGCAGATTAAATCATAGTAACATATGATTACACACTCTCTGGATTGGCAGAAATTTAAACCTGCAATACCATGTAAAG
GATGTGAATGAATGGGAGTTTTGTATTAGTTGACAGGAGTCTAACTTGGTACAAATTATATCGGAAACAAATTTGCTGTACCTA
5 ACCAAGTTCAACCTGCAAAATAAATTACAAACAGCCATCTTACCCCTAGGTATACACCTAAGAAAAATGATTACCTATGTGCTTTA
AGAAACATGAACAAAACAAAATAAATTGATGCTGGCAAGGTTATGGAGAAAAAGGAACACTTACACACTCTCGGTGGGAGGTAA
ATCAGTTACGCCATTGTGGAAGACTGTGATGATTGCTCAAAGTCTTAAAGATAGAAATACCACTCAACCCAGCAGTTTCATTACTG
10 TGCATATACCCAAAGGAATATAAATTATTCTAAGACACATACACGTGTATGTTCTGTTGCGGCACATTACACATAAGCAAGACAT
GTAATCAACCTAAATGCCATCAGTGTAGACTGGATAAAGAAAAATGTGGTACATACACCATGGAATACATATGCAGCCATAAAAA
GAATGAGATCATGTCCTTTGAGGAGCATAGATGGAGCTGGGGCCATTATCCTTAAAGCGGACTAACACAGGAACAGAAAAACCAA
15 CTGCACATTCTCACTTATAAGTGGGAGCTAAATGATGAAAAACGCATGGACATATAGAGGGGAACACCGACACTGAGACCTATTAG
AGGGTGGGAAGAGGAGAGAATCAGGGAAAAATACTAATGGATACACAGGCTAATACCTGAGTGTAAATAATCTGTATAGCATA
CCTCCATGACACAAGTTTACCTGTGTAAACACAGTACATGTGCATACCCCTGAACCTTAAAGAAAAACATGGACAAACATATT
CAAAGAGCATTGTTTATAAGAGCAAAAACTGGAAGCAACCCAAATAAATGCCATCAACATTGAATCGAATCAGCACATTTTGC
20 TGTGAGGTATTTATACACTGTGATACTATTGGCAATGAAAACTCACTAGTATAACACATATAGAAGGGTGTGGAGAGGCAGCA
TTCTTGGTGGTCAAGAGGAAGGATTGTGCTGGGTTCAGATTGTGGTCTGCCACTATTGTGTGACCTTGGATGAATTTCTGAA
CTTCAGTGTACCTTAGTTTCTCATCTGTACATCAGGGAATGATGTCTACCTGATAGTGTGTTAGGAAGTTTAAATGAGTCAA
TGTGTGACATGCTTAGGAGAATGACTGGCAGACAATACATTCTATATGTGTTTGTAAACAAATAAAGTGCATCAAAATGGAT
GAATCTTACAAACAATATGGAAGAAAGAAAGCAAGATAGAAGAAATATATACAGTGTGATTCTATTGATGAAAGTCAAAAGCATG
25 CAAAACATAATATGTTATTAGGATACATACATAGATGGTAAACTATAAGAAAAATTAATATGATTATGTTACACAAA
AAGCAGTATAACAGCTACCTCCAGAGGTGAAGGAGTGGGTATGATAGAGAAGGGGCTCACTGGGGGCTTCTGAGGTCTTGGCAGTG
TTTTATCTCCCAACCTGGACAGTGGTCCCAAGGATATTCTTCTCTTAATTTGTTTTTAAAACTGTCTATGTTTTTATATATGT
GTGACCTATTAGTAAACATTTTAAAGGATTATGTGAGTTGTATAGTAGCAAGATGACATTAATAGAAATAACTGTAAATGCT
ACATTTTAGTTAGTTAAATAAATGTTCAAGTGCACATGGGAACCTTGGCTGGTATTATTCTCCCAACACTGTGAGCCACTGT
30 CAGTGTGATTCTTACAGAAGGCGACACCTCTTAAGGCCACATTAAGAGAGCTGTCCCTTTAGATCAGGGAATGTAATGTTCTCA
CTCAACTACTCTCAGGTCTGGATGTCCCATGTGTGGGATGCTATGTCTTGTCCCAAGGGATTATTTTAAAGAAAGATTTTCCACC
AGAGGGAGCATTTTCTGTGATAAAGATGTTTAGGGTCTGGAACCTTACAGTTCTAAGAGTGGCCAAAGGAGTGGGGATTTTCA
ACATGGAGAAGAGGAGATGTTGGGAGAGAAAGAGTGTCTCCATCACTAGAAGTGAAGCAGCCTTCTCTTGTGCTTCCCTCTCT
40 TTAATATACAAGTCCCTCCCTGTAAATGTCTACCTTGGAGGAGGTTTCAAGTCTGGATCTGGAGATGCCCAAGCAGAGGCTGT
GGGACCTCCCTTAGACTTGACTGGGGCCACAATACCACTGCTGGTCCCTGGACAGCAGCATCGGCATCCGAGCTTGTGA
GAAATGAAGTCTCAGGGCCACCCACACTACTGAGTCTGAATCTGCATTTCTCAAGGTGCCCTGGGTCTCACATAACATCAA
AATTTGAGAGGCACTGGGCTAAATGTCTCAAGATCCCTCATGGTCTTAAAGTTTAAATGATTATAGAAATAAATGTATGTTCA
35 ACTGAAAATTATCAGTTTCAATGTGATGACATTATCAATTTAAACACCTTGGGATGTTACATGTCCACAGAACCATGTAAGTATTG
TTGCTAAATATGTTTTTAAATGGATTGTCCAGTTTCCCCCGATGTCAAAGTTAGGTTGCTTATGTATTGGGCACCTATAAGAATT
AAAATATTACATAACGTTGTATTTCTTCTTCTAATACATACAGGATTAGATTCTTGCTTTAAATTTCTCAATTAATGTCTTCAA
40 TTTCTTTTATATTCAATGAAAATCAAAGCAGATTAGGTTCTGAATACCTGTAAAGAACTCAAAGGGATTTTAAATAAAA
TATATCTCATTAAATACATTGATTTTATATTTAGCATATTTTCTTCTTATACATAGTCCATATTTTACCTTATGGGAACCTTTG
AAGTCTGAGTATTTTATAATGATTCTCCACAATACCTCTTATCTTTAGATTCTAGATCTGAGATCAGGCAAGTAAATAGTTTT
ACCTTTTCCCTCAAAGGCCATGACTAACAGCTCACTTACTTTTCTTAAATATTTTGCTAATTATCTTTTAACTGATGAA
45 TTTCAAGTGGAAATCCATGATTCAATTAATCTTTCCCTTATGTAAATAGTCACTTGTCTTTTGTATGTTCTAGCAAACTAAT
ATTTAAAGGGCTAGTCATAAAATCCAAATAAAAGTCTTAAATGACTTAAATAAGAGATAAAATATGCTTTACTGTATAGTA
AAAATGGAGAAAACGTTCTCATGAATAGATGTTCTTAAAGCTGTGAGTTATTTGATTAAAGCGTGTGTTACCAGGTCTGTGTTCTT
50 TTGGTATATAGGACCAAGAAACACTACTTTATGGCTTAATGTTTGTCTGACGTATGTCTATAGATGAGATAATGATGAACTCTG
TTTATAAAATGATAAAGTAGTGTAGACTTTTTTTTTTTTTTTTGGAGACGAGTCTCGCTCTGTGCGCCAGGCTGGAGTGCAGTGG
CATGATCTCGGCTCACTGCAACCTCCACCTCCTGGGTCAAGCGACTCTCTGCTCAGCCTCTTGTAGTGGCTGCGATTACAGGCA
45 TGTGCTGCGCTGCGCCAGCTAATTTTGTATTTTATAGAGACGGGTTTCCCTATGTTGGCCAGGCTGCTCTGAACTCTGATC
TCAGGTGATCCGCCACCTCAGCCTCCCAAGTGTGGGATTACAGCATGAGCCACCGTGCCTGGCCGTATTCTTTTTTTTTTAA
GAGCAAGATTAGGAAGATTACTGATATTTCTATAGCGTTTGTTCGATTTAGATTTTTCAGAAATGGTTGAAATCACAATTTCT
55 TAGCTGAACTCTAAACCTGGTCTGTGCTGAGTGTAGGATGAGCAGCATGTGCGCATTGAGCATATGAATGTGGTGTGAGATG
GCTGTGCAATATACACAGCTTTCAAACAAAAGGATATATATCTCCTTGATAATTTTTATTATGTTGATTACATGTTGAAATGAT
AATGTTTTACATATATAGGATTAACTAGTAAATATTAAGATACATTTGGCCTGTTCTTTTACTTTTAAATGGCTACTAGAAA
60 AGAAAAGAGATCAGAGCTTAAACAGAGATTAGAGATGAGGTGCCACGACAGAAATCCACTTACTTGAAGAAATCCAGTCTGC
ACCTTTGCCCTACTTTTACAGATTACTGCTTCTTGAACCCAAAGTAGAGCACTGGGTAGCAAGCATTTAATATCTACAATGTA
CAGAGCATTTGAAGGGGATTAAAATAAGTATCACACAGGTCCCTGCTTTAGGGAAAACATATAGTCTACTGGGGAAGCAAGATAT
55 GAGCATGAGTTGTTAAATCATGGCTTGAGAGATACATAGCTGTTCAATGCTCAGGTCCAAGACTGTTGCAACAGACGGTTGAG
GCACTAAAAAAGTGTCTCAAAGGAAGGAAGGTCTCCACGGCTGGAAGGTCTCCATGGCTGGAAGGGTGTCCACCAAGAGGA
ATGCTTGGCTGGGCACTGACGAGTGGGTAGAATTTCAAGTGGGAGAGAGAAAGGGGCATGGCCAGGTAGGAGGCAGGGTAGAGT
65 GGAAGAGAGGAGGAAAACATGGAAGACAGAAATGGTTGAGAAGTCACTGAGAGAGAGATGGATTGAACCTGTGAGCTGTGAGT
AGAATCATTCTCTAGTCCACTTATTATTGAAGCTTTAATATTTGACATCGTCTCTATAATATTATGTATCTTGACACTCTTCCGA
AAATTTTACCAAGTGTCTCAAAGTAGAGGTTAGGGCAGGACACTTAACTTTGGGTAGAAATAATGTTGCATATCTTTGATTGT
70 AAAGGCTTCTCGGATAAGTACATTATTAGTATTTAGGCAAGTGTGCTCAGCATTGTATATTCTTCTGCTTAAATGCTTCTCAG
TGTTATGTCATTGTGATCTTGTGCTTGGCTCCATTTATAGAACTGGAAGCCAGAGAAAGCTAAGATTGAATAATTAATGGTAGAGT
CTGGAATTTGAACCTAGCTCTTAAGCTTCTCCATTTACTGTGTGAAACACACTAGTTTTCATTCTGTAAGTCTGTGTTCTTAAAG
65 AGAAGCTGTAATTTTATTTCTTTTAAATGAATGATATATAAATAGGGAAGATGATGATATAACATATATTCTTACTGA
CGAATTTCCATAAAGTGAACAGCTGTGTAACCAAGTCCAGATTAAAGACACAGCATTATCAGCGCCCTAGAAATCCCTCAGGCT
TCCATCCAGTAACTACTTACCCTGGTGAAGCACTACTGACTTGGGAAAGCATAGATTGCTTTGCTGTTTGAACCTTTATA
75 TCAATGGAGATACAGAAATGTAATTTTGTGCTAACTCTTCACTCGATAATGACAGTTAACTCATATTGTGACATTGTGACACC
ATATTGACTATGGTAGTTGATTTTCAATCTCCATGCTATATAGTATTATTTGTGTGACTATACCACTATTTATTAAATTTGTATA
GTTTCCAGTTTGGGGCCATTATGAGTAGCAATGTGAAGATTCTAGAACATATCTCAGGTGAACACATAATTTTGTGTTGGGC
ATATTTAGAGTTAAATCAGGAAGCAGTGAATTTTAAATGTCTTGTAGATGAGGCTGAAATTTGACTTTGTGACCTTCCAA
GAAAGAAAGTGAACCTCAAAGTGTGGTGTCTGAATAGTATATAAAATAAATACTAAGGCAGCCATTATGAAAGGTTCCAAG
GTAGAGGAATTTAATGCCGCAACATTTTCAAGGGAGGATGAAATAGTCAATCTCATATAGAGAGAAATTTGAAAGGGTTA
GGATGTAAATCTGACGTTTATCACTCAGGTTTCTCTTACAGTTATATTTTTTCTTCAAGAGAACTTTAGCAGGTGATAG
75 TGGAAACTAAGGTGTGATTGTTACCAAAATGACCATTGTCCACGGTATAATAAGGATGAATACTGCGGAGTGTATTTACTAG

367

AGTAGAAGTACCATTCCATCTAGCAATCCCACTATTATCTACCCAAAGGAAAAGAGTCATTATATGAAAAAGACACTTGCACATG
CATGTTTGTAGCAGCACAATTTCGCAATTTCAAATAATGGAACAGCTTAAATACCCATCAACCAATGAGTGGATAAAGAAAATGT
GGTATATATACATCATGAAATACTACTCAGCCATAAAAAGGAACAAAATAATGGCATTACAGCAATCTGGATGGAATGGAGACC
ATTATCCTTACGAGTAAGTAACTCAGGAATGGAAGAACCAATATAGTGTATCATAAGAAATGATATAATGGACTCTGGAGACTCAGAGT
5 GAAGTCCCATAGGGAACCTTATCATGTAAACAGAAACCATATGTTCCCCCAAACCTATTGAAATAAAATAAAATTTAAATTTAAAA
TTTTAAAGTTACACAGCTGCCAGCGTGTGCCACTCACCGGGGCCATCAGCTTATTCTGTGATTTTCTAAGCATCTTATGAA
CACACTGATTGTTATAAGGAATCCAAACAATATAGCACTGCCCACTTGGGGCTGCTATTTGTTTGGGGCTCTTTTATTATGGAA
AGTCCAAACCGATATGAAATAACCTAAATTTCTCTGACTTCTCAGAAATCTCAAAACATCAAAATGTGCCCTGTCTTTTGATGC
10 TGGTTACCCCTTGGTGGGAATCCAGGATTTCTTATTTTCTGAGTGTACAGCTGTGAGTTGTAAGCATTTTCACTCACCACATGCTA
GTTACAGTTGATTTTATTAAAGCTGCCAGATTGGAAATGCACCTCACTATAGCATTAGTTTAAAAAATTTAGGAAGGGGAGAAAGA
AATTTGTATGTACAAATGATATTTTTTACTTTTGGACTGTAAGTATGTTTTTGGTTCTTTATTCTTCCACCAGTTTCTTCTGGGT
AATCTGTAATTTGGTGTATCACTTTTAGAAAACCTCAGAAGACTTAGGAGTATGTAAGCTCTCTCCCTTCCCTTCCACCCCTCACC
CCAGCATCACTAGTATTTTCTGTTGCTATTAGCATCTTCACTCAGAAGGACGAGAGGGGAGAAAAAATGAAATGAAGTTAATTT
15 TGTTCAGCAAAAGTTAAAGTGTCTGGCTGAACCTCTGGGTAGCTGGTTTGGAGTTGTATGGGGTTTCATTATTCTCCAGGTCTCT
TAGTCTTCACTTGAAAAAGAACTAGAGTTCATTTTTCTGACAAGAATGAACCTAATTATTACCTAGAATGGTTAGTAATCTG
TCTTATTACAGAAAGCTTCTCTGATCTATTAGTATCTTTTCTAAGAGTTTGAATATATAGCATGTATCTCAATAGA
ATCTAATCTTTCATTATTAAAGTTCCTAAATATCTTATATTACTATGTTTTATCATTATGAACATTGACTCTCATTGTTTAGAGTT
TTGCTTCTCTAATTTATCTGGGTGAAGGACAGTTTGTGTTTTAATTTCCAGTATGTGATGGATTGATAATTTTAAAAATCAAT
20 AAAAAATGATTTACTAGAAAAATGAAATCTAGAAAAATGAAATTTAAAGAACTAAAAACATAAGCCTGATTAACCATTTATTATT
CTTATAGTCAACAGACATAAAATTAATCTGGAAGCTGTGTAATAAAATTTCTAAAGGTCTACTCTCAGTTTCTGTGCTTATTCTG
GGACTAGGGCTGGTCTGCAGAGTCCAGTTTCAGTTGCACTGTTGGACAGAAATATATACAACTTAGGAGACTGAAGTTCACTAGATA
CTAATTTCAAGAACATATCTCAAGTGGGTTTTTGGGAGCTGTCCCTTACATTTCTGCAATGATAAAGGCAAGTGCAGTTGCTG
GGTACAGTGGTTCTGGCTGTAACTCCAGCACTTTGGGAGGCCAAGGCAGGCAGATCACTTGAGATCAGGGGTTTGAGGCAAAATTT
25 GGGCAACATGGAACCTCGTCTCTAAAAATACAAAAATTAGCTGGGCATGGTGGTGTGCACTGTAACTCCAGCTACTCAGGAG
CTGAGGATCATGGAATTCGCTGAACCCAGGAGGCGAGGTTGCACTAAGCCAAAGATCATGGCACTGCACTCTAGCTGCGGCAAG
AGCAAGACCTGTCTTGAATAAAAAAAAAAAAAAAGGCAAGTGCAGAAAAAATGCTGTTTACTTAACTTTTTCTATTTTA
AAAAAATTTAGGACAAATGCATAAAATTAATTTAGGTGAATAGAAAAAGTTGATGCTTTCTCCACTCTCTGTTTCTTT
30 TCCTTTCTCTACATCATATACATACATACATACATACATACATACATACATGAGAGGACATTTTTCTGCTATGAAATGGCATC
ATAAACAACTACTCTGCACTTTCTTAAATTTTTGTTTACAACATTTATCTTATCAAAATATGAATCTAGTGGCTCTTTTAAACAGT
TGCAATAATCTCTATGGTATCGTTGTACCATAGTTTATTCAATTAATCCCCAGCTGATATACCTTCAAGAGCATCTTAGGTTTTTA
CCATTCTTAAACACTGCAGTTAAATTTCTGTACATATATTCACTGTGATCTACTTTGATATTGAAGGATAGATTCTTAAAAAC
GGAGTCAGTGCATGATGTCAGATGATATCTCCAAAAAGTTGCACTGCTGATAGAGTCAACCTGCAAAATATGAGAGTAC
35 CTGTTTCCCTCACCCTGCCAGGTGTAGGAGTCTTTTAAAGTGTCTCTCTCTGCGGTGTAAAGTGAATCACTAGCTGTTTAAAT
TGAGTTCCCTGATTGCCAGCAAGAGTGTCTTTTATATGTTTAAAGGCTGTGATCTTTCTATTCAATTTGGGGGCAAC
AAAAATGTCAGAGATTTTATTTTATTAGGTTTCTGTGTACCAAGTTTCTGCTGCTGGTACACTAGTGGTGGGTTTATATTAT
TTGTTCTGTTTAGTAGGGTAGAGGACATGGGAAAAGAACAAAGATACAGTGTGAGGGTTTTTGGTGGGGGGAGATGCTTAGT
40 TCTGATTTCTTTGTCTAACATGTTTTTTTTCTTCAAGATCAGCTTACAGGAATCCGTCCTTATTGTGTGTAATGTAAGGAGG
CACAGGTGGGGCATCTTTATAGCTTGGCATAGTGTATATGCTTAATCAAGATTGGCTCAAGACTATGGCTGCCATGTGACTTT
TAAAAAATTGAGGTAAAGTTCATATAGAATTAACCTCTCAAGTGTACAAATTCAGTGGCATATAGTACATTTACAGTCCGTCGCA
CTGGGACCTCTATCCAGTTCTGAAACATTTCTCTACCCCAAAGGAACTCCGTCCTTAAAGCAGTCACTCTCTATCCCCCTTA
45 TCCCTCAACCCCTGGAAACCACTTCTCTGCTTCTGCTCTATGTTTCACTTTTCTGATATTTCATATAAATGAGTACGCA
GTATGTGATTTTTATGTCTGGCTTTTTTCACTTAGCATAACATTTTTGAGGTTCACTTGTATTGTGTGTATCAGTACTTCAT
TCCTTATTGTGGTGGATAAAATTTTATTGTATGCTACAATATACAATAAATTTGTTTATCCATTACAGTTGATATTAGGGTTGT
50 TTCCACCTTTTGGCTGTGTAACAAATGGCCATGTGCACTGCAAGTTAAGTCAAGAGGATAGAGGATAGAGGATAGAGGATAG
ACAGCTGAAAGAACCTCCAGGGAGCATCTTCTGTCTCTAGAGCCTTCTCTCTCTGATGTTGGTCACTACAGGCTCTTTAGG
AGGCTGGGTGAGTGTGGGGCCAGATTTGGGATCTGTTTCACTGCGTTCAAGTATCTTCTGTTAAACAGAGATAGACCCTCCATAT
CACACCTCTGGAATTTAAAAAGGAATTTACATCCACCTCAGGCACTAGTCTGCTAGCCTCCATGGGTGAGTGGCGCA
55 GGAACATTTAGGCTATTCTCTCCATGGTTGTGCTCTTACCTTTAGCATCTGGGTGGAGCTTGTAGAAATGTGGTGTAGGAGCA
ATTGTGCCACATAGTACCTGGGCATATGACAGTATAGGCTCATTTCCCATCTCTGACGCTTAGTCCAGTTATGTATCTCTCAGT
TTTCTCCCTGGTAAATGGCATTACTAATACTTACATCATAGGTTGTAGAGATAGTTACATGGGATAATGTATAGAGAGCATGT
TACAGTACCTGTGGTAGTACTTGTAAATGTTCTTCTGTTCTCAGTGTCTGCTGCTCTCTCTGCTGCTCTCTCTGCTGCTGCT
60 ATTACATACCTCACAGGTAGTATTAAAGTTAAATGAGTTGATAATGCAGAGGAAGTCTCTAGCACCATGCCTGCAACGTAAAT
CAACACTCACTATAGATAGAAAGGTACCTTACCTTGCACTTAGGATTTCTCATTGGGAAAATGCCATCCAATTGATTACAAGCCGT
CTAAAGTGTTTTAAAGTGGTAAAGATTTCACTGGGTATATTGAGTTGTTCTGACGCTGGTGTATTACCATAGACACATCGGGC
65 TAATTAAGACAGCCATGTTCAAGATAGATGCACTATCACTAAGATCTGATGTGTAGTGGGCACTTTCCCATCATGTTAGCACAA
ATATATTAAAGAAAGTTACTTTTATATCAAGTGTGTGATCCCAAGAAAATACTGTACAGCCTAAAGTCTCTTTCTTGTGGA
AGCTGACAAGAGACTTCTGTCTGGCCCTCAAAGTGGTTAGTATCTTATTGAGCACTCTTGGGTGCTGTTATTAGAAATTC
70 TATTTTAGAGCAAAATGGGAAGGATTTTAAAAAAGGAGAAGCAACTGTCTCCACCATGCTCTCTCTCAGCTGTGTAACAGCC
TCTCTGAGGGTGAAGTGGATCCCCATAATGTGGGCCCCATGTGTGAACCTTTTCAAGGTTTTCTGTTGTAATGGCTGATATAAT
TAAAGGAGAGAGTTATGTTTTGCTGAAATGGAGCATGCTTGAGTTACAATGTTTTGTTTTCTCAGCAAAATATATCTGACTA
75 TAATAGCAACAGCTTGTATAAGATTTTACATAAACATTTGAAAAAGCATTCTGTCTTCACTGAAATTTTGAAGCCTTTTAAAG
AATATTGTAGCACTTATGTTTTTAAATGTACAGGTCTAACATGCACTGTTTATTGTTGTAATTTCACTCAGAGGGTCTTTGA
ATCTACCTCCAACTCTCAGGGTCTCCAGACTTCCAGGAACCACTGCTGACAGCTGGAGAGACAGAGGTAACCAAGGCTCT
65 ACTGGAGGGAAGACAGGAAACCCCAAGGACAGCTTCTGGAGAAAAATGCTGGCTGTAAGTCCCTTCACTTCCCTCC
CAGATACACACTTCCAGGATGTGCAATTGAGTCAACATCATGTCTGTAGAGGACAAACATGTCTTTGTTAGTCTTGACATTT
CTTTAGCCCTAGGCTCTCAAGTTTGGATATGTGATGCTCAAGAAATGCATTACAATTTGAAAACCTGGTGTCTATTAAAGTAA
70 TCTTTTAAATTTTTCTTTTCTTTTCTTTTGAATAATCAACCTTACAGAGGAGATGAAAGAAATCATATGAAGAACTTTATATACCC
TTTGTATATTTGCCAATTTAATAATTTGTTATTTGCTCTGAATTTATAGTTTGTATGTGTGTGGCAAGAGGGGTTTCACT
TTTTAGAACTATTTAAAGTAAGTTGCAGACTTACTTTCATGACATTTTCCCTGAAGACCTCAGCATCATTTCTGAAGAAATAGA
75 ACATTTTCTCAGTAAACCAATCTGTTTAAAGTAAGTCTTAATGAAACCTCAGACAGAGGACAAAGAGTAAAGAGGAGCAG
AGATTGAACAAAGCTGTAATGAACCTGGAAAGTATAAGGAGAAGAAATATAGGAGGTAATAGAACTCTGTTTGGTCTCTTAA
AGGATAAATTTGTATATACAGCAATCACTCAATGAATGCAGATTTTCTCAAAATTTACTTTATCTAGTCTCAAGGAGTTTCT
CCTGGTCTCTGAAGTCAGTGTTTTGGCCAGGGTTATAAGCTTTTCAAGGATTTTCTGCTGCTGCTTACCTTGAAGAACATGGGA
CTGAGTGACCAATCTACTTAGACTTGTGTTTAGGAGCAAAATTTCAAGGATTTTCTGCTGCTGCTTACCTTGAAGAACATGGGA

5 CCTTCAGTTATTACAGTCAGAAATGTTTACTAATGGGCAGTTAGTGTAACATGGGAGTCCCTTCTGACATTTAATTTAGGTTTG
AGTAAAGCTGATGTGTAGCACACTATTTTGAGAAATAATTTACAGGCTTGGCAAAATGTTAAGCTTGATGTATCAGACTT
TTGCAGATTTAGGCTTCAGGAGTCAGCGCAAGAAAAATGCTACTCTTATAAAGGCTGAACAGCAGGAACAAAGTTAAGTGGATGG
CATGTAGTGTCATCACTAATTTGTCTATTTTAAACAAAGATATACATTTTCTTGATACCAATAGCTTATAGAACATTTAAACAAAT
10 TAAAGGTTTATTGGACTGTTTCCCTGAAAGCCTCTTCTCGGTAGGATTTAATATTTTGCCAGAAGAATATGTGTTGGGGATT
TATTTTTCAAATTTTTAAAAAGCTATTTTCACTAAGCTTTGGGAGGGGAACCATATTAAGCTGTCTGTCTAACTAAGCACATCA
GGCATCATCATGTCAAGAAATGAGAACTATGTGTTTCTTTAAACAGCAGTGATGTATGATAGAGATGTTTGACCCATGATTTTTCAT
GAAAAGTCCATTTTCAGTAACTCTGTGCTTACCTAGTGTCTTCAATGTGATACTGGCTTCCACTGATCAGGGGTGAGATGC
ATCACAGAGAGTTTGAAGTACACATTTTGTCTTTTATTTCTTTTCTTTTACTCTTTCAGCCTTCAGTGGCCATGGAGATTTT
15 TATTTTTAAATTTCAAATTTTACATATCAAATTTTACAACTGTGACTTTTAAAAATAATGTGTGACTCTTTCTGTGAGTGAATTTT
AAAAAGCATTTAATGTAAATGCATGTGTAGTTTCTGTGTATCAAAGCCATGCTTTTCTTAGATCAGCTTAATCGTCTCTGTGTT
AGCTCTTGAGCTATCTTGTGGCTGTCTTACGTAGACCATTTGAAATCTTCTCTTTAATGCCAAGTATCCACTTTTCACGTGTAA
ATTGGAGATGTCTACTCTGCACTTGGACACAGTGTGTGATGTAATGTTGATGTGTCATCATGGTTTGTGGTACTCTGTGA
20 TAATTTTGTTTTTAGAGGCAAAATTTGTGAGGCCAACTTCGGAGATTGGGTCTGTACATCATTCATCTTTTCAGTCAGTAAACA
TCCATTTAGTGCTACTCTGTGTGAGTGTCTGCTCAAAAAGGAACAGGGCAGGATGCTGTCTGGAATCATGTGCACGCATGGTGA
CCATGAATGGGTCTAACACACACAGCCCTTGAATGGCTGGGAATGGGGCTGGGGATGGGAAGGGCTCCACAGATAGAGTG
AATTGGTCTGTAAAGTCATCGCTGTACAAATGAATCCAAACCAACATTTGAAAGAATGCACAGTAGATTCCCCAGTTAGGGCA
GGGTATAGAGCATTTTGGGCAAGAGCCCATACAAGGCCATAGAAGCATGAACATATGCCACATTTGATGAATTTCAAATAACT
25 TCATATAATGAGAGTTTGGGAACATGGAGAAGGTAGTGGAGGAAGATCAGACTAAAATGATTATGAAGGACCTTACGTACCATGC
CAAGGAGGCTGGCCTTCATCTGTAGTCAGTGGGAACAACTTCAGGAATCTCAATGCAGAGGTTTCATGATGAAATTTGTGCTTT
AGAAATATTTCTTTCAGCAGCTGTGGAGGTACAGATAAGTAGGAATGGAATCCAAGGCGAGAGGGTCACTCTGCTCTACAGAAAT
TCATGGGGCAGTGGCAGTGGGAGATAAGGAGATGATGGTGTGAGAGCCAGTTAAGAAATAGAATCCTCAGAACTTGGTAACTGA
30 TTGGTTATGAGTATGTAGACTACATGGGTGACTACATGAGTGTATCATCAGTATATAAGTATATAAGTGTCAATTAGATCGTGA
GATCAAGGGGCGATATTAATGTAGGAAACAGAGAACAGAGAAACCAATGATATAAGCCCTAGGAAGTGGACTTTAAGGAGGAAG
CAAATAAAAGAAAGCTTTAGAGGAATGATCTGAGGATAGAGAAACCTGAGGATAGGGGTGCTCCAGAACCTTAAAGCAGGAAT
CTGCAGAGGAGGAGTAGTCAAGAAATGTTGAATACTTCAGAGGGGTCAAGCAAGGGTCCAGGATGTGTCAACTGGTAGGTTTCAG
TAATCCTAGCAAGAGCAATTAGTGGGTGGTGAATAAAGAAATAGAGTGGTTCATTATACTACTCTTCAAGGAGCTTAGATAC
35 TAAGGGAAGGAGAGCAAGAGTTGTCAAGGAACATTTTAAATTTCTTTTCAAGTTAAAAATCTCAAGCAATTTTACATCTCTGT
AGGATAGATATAATCATTAGACAGGAAGAAGAGGAGATACTGATGGAATAATGTCTTAAGCAGATCTGATGGCAGCTAAGCT
AGAACACATGGCAAGATTAGCTTTGGGCTAGACAAAGGACAACTCAGTTTAAATAGATGGGAACAAAGGAGGAAGAGCTGGGTGT
GGATATGGATAAGGAGTTGTAGTCTTGAAGTTGGAAGTTGAGGGGTGTAGTGTCCATGAAATAAGTGTCTAGATCTACAGCT
40 AGAAGGCTGTAGTGTAGTGTGCT
CCAGTCATGACCAAGCAATAGGGGCTCTTATTCAGGCTCACTCTGTGGGACACAGGACTTTCCAGTGGGCCAAATTTGGCT
35 CAAGAACTCTATTGGCCTGAGCAGACCTTTCTTGAAGTGTGTTGGAATCCAAGACTTCTAGCCATTCTTCTCTCTCTCTCT
CCATGCTCCTAGGTGTGTTTGAAGGACCTCCCACTTCTGGGCTTCTTCTCAATATATCTTTGTATTTCTAGTCTCTATCTT
GGTACTGTCTCTGGGTAGACCCAACTAACATAAAGAAATTTGGTGAAGATGTGTATATTAAAGTAATGCTAGCTGTGTA
ATAAATCTCTCAGTTCAACACATGTACATCATTGACAGAGAAATTAGTAAGAAATGCAGGACTTGAATTTGGCCAA
45 TGGACCAATAGACATGTACAGAAATTTCCATCCAACAGCAGCAGAAATGTAAGTTTCTTAGAGTATACATAGAACATTTCCAG
GATAGACCATATGTTAGGCCACAAATTTAAGATTGAAATATGTCTAGTATCATTTGATATAACTTCAACACAGTGGTATA
AACTAGACATCAGTGACAGGAGGAATCTTGAAGAAATCACAATATCTGGAACATAAACACATGCCCCAGAACACCAATGGGT
AAGAGAAATTTAAAGATAAATTTAAAAAATGCTTGAACAAATGACAAACGGAACACAAATATACCAAGATGATGGGATATAG
50 GAGAAGCAGTTCTGAGAGGAAAGTTTATAGCAATATATGCTACATTAGAAAAGAAAGATCTCAAATGAATAGTGTGACATTA
CACCTCAAGGAACATAGAAAAGAACAACTAAAACCAATTAGTAGAAGGAAAGAAATAAAAATCAGAACAAACATAAAGTAAAT
45 GATAATAGAAAGCCACAGGAAGAAATCAATAACTTAAGATTGAGGTTTGGGTTTCTTAAAGTAAATTTGGCAACCCATAGTCTA
ACAAAGAAAAAGAACTCAAGTAAACCAAAATGAAATGAAGAAATTAACACAGACCTCGGGAATAAAAAGGATGATAAG
TCCCTATTAGCAACAAATTTATATGCAACAAATTTGGGTGGCTAGAGGAAACAGATAAATCTTAGGAAATTAACCTACAGGAT
TGACTCAGGAAGAAATAGAAAGCTGTAAACAGACCAATCACAATAGATTGGAGAAGTAATGAAAACTCTCAACAAAGACAAGC
55 CCAGAACAGATAGCTTCAAGCTGAGTTCTACAGAGATTTCAAGAAATGATACAGTACTTCTTAACTCTCAAGAAATAG
AACTAGAGGAATACTTTCAACACATTTTATGAGGCCAGGATCACCTGATACCCAGCCAGCCAAAGACATCACAAGAAAGAAA
50 ATTTAAAGCAATTTCTCTGATGAATATTGGTGCAAAAAGCCCCAGTAAATATTAGGAAACCAATCCAACACATCAAAAAG
ATTACATGCTATGACTAAGTGGGATTTTCCATGAAAGTCTAGTATCAGGCAGGCATGGATGCCACTTTCACTCTGATTTCAACATA
TTAACAGAAATGAAAGATAAATACATGATAATCTAATTGACACAGAAAGCATTTGACAAAGTCCAACATCCTTATTGAGA
55 AAAATGCTCAATAGTGTATGTATAGAAGGAAGCTTCTATGTATAAAGGCCATTTATGAAAAACCCACAGCTAACATTATAAT
ACATGGGGGAAAACTGAAAGTTTTCATGAAAGTCTAGTATCAGGCAGGCATGGATGCCACTTTCACTCTGATTTCAACATA
GTACTGGAAGTACCAGCAATAGTAATTAGATAGGAAAAGAAATTAAGGCATTGAGGTGAGGAAGTAAGTATCTCTATTT
GCAGATGGTGTATCTATATTGTAGGGGGGAAAAAGCCCTGAGATTCCACACAAAAAATGTTAGAACACCAAGTAAAT
60 CAGTAAAGCTGTGGGGTGCAAAATCAACATGCAAAATCAGTTGCGTTTCTTATACCAATTAACATCTGTTTGAAGAAACATG
AAGAAAATGGTCCCACTTAACAAAGCATCAAAAAGAACAAATACCTAGGAATAAATCAACCAATGTGAAGATGTGTACTGA
AACTATAAAACATTAATGAAAGAAATTAAGCACAAAAAATGGAAGATATCACATGCTCATGGATCAGAAGAAATTAATTTGTT
65 GAAATGCTCATATACCCAAAGCAATATACAGATTCCGTGCAATCTCTATCAAAATCCAGTGACCTTCTTCAACAGAAATGAAAA
AATGCTTCTTAAATTTGTACAGAACCATGAAGACCCCTGAATAGCCAAAACAATTAAGAAAAGCAAAAGTTGGAGGTATTA
TACTTCTGATTTAAAAATTAATTAACAAAGTTATAGTAATAAAGACAGTATTATACAGGCATAAAAAACAGACATAGACCAAGT
70 GAACAGAAATAGAGATCCAGAAATAATCCACGTATATAGTCAACTAATTTTGAAGGGCCACCAAGAACCAATAGGGA
AGAATAGTCTCTTTGATAGGATGTTAAGAAACTGGATTTCACATGCAAAAGAAATGGAATTTGAGTCTTATCGTATACCATAC
AAAAATCACTCAAAATGATAAAGACCTAAACATAAAGCAGAACTATAAACTCTACACAGGAACATAGGGGAATAGCTCC
75 TGGACATTTGGCGTTGGTAGTCAGCTTTGGATATCACAACAGAGCTCAGGCCACAAAGCAAAATTAATTAATGGGGGCTGGGC
GCAGTGGCTCAGCGCTGAATCCCGGCACTTTTGGGAGGCTGAGGTAGGGGGATCAAGGTGAGGAGATCAAGGACCATCTGGCC
AACATGGTGAAACCCCATCTCTACTAAAAATACAAAAATAGCTGGGTGTGGTGGCGCACCTGTAATTCAGCTACTTGGGAGG
CTGAGGCAGGAGAAATCGCTGAACCCAGGAGGCCGAGATTGTAGTGAGCGGAGATGGCGCACTGCACTCTAGCTGGAGGACAGA
GTGAGACTCCATCTCAAAAAATAAATAAATAAATGGGACTACACAACTAGAAAGTTTCTGTACAGTAAGAGGAACATCAACAA
AGTGAAGTAGCAGCTACAGATTGGGAAAAATTTCAATCAGTATATCCAATATTCCAATGTACATCAGATATATTGTAATCAT
GTATTGTTGAAGGAGTTAGTAGCCAAATTTTACAGGAACATACAACTCAATAGCAAGAACAAACGAATTAACCTGATTTATAA
ATGGGGCAAGGCTCAGTAGACATTTTCTAAAGAGACACAAAGATGGCCACAGGCATATGAAGGGGTACACACATCATATG
AGGGAATGCAAAATCAAAACCACTGTGATTTACCTCTCACAACTGTTAGGATGGCTGTTATCAAAAGTCAAAAGATAACAAATG

TTGGTGAGGATGTGGAGGACTCTTGCTCCACTGTTGGTGGGAATGTAGATTGGGTATAGCCGTTATGGAACCGTTATAGAGGTTTC
 TAAAGAAATTAAGAAACAGAACTACCATATATGACCCAGCCATTCTCTTTCTGGGCATATACCCAAAGGAAATGAAATCACCACCTC
 ATAAGAGATGTCGCACTCCCATTCTCTGCTGAGCATGATTCAACAATAAGATATGGAACCAACCTAAGTGTCTGATGTGAGC
 AAATAGAGAAAGAGTGGCTGTAAAGTATACCACTTTGGTTTATACAAATGAATATTATTTCAGCCCTAGAAAAATATGAGAGCTT
 5 GTCATTTGCCACAACATGGGAAAGCCCATTTGTGCTAAGCGAAATACGCCAAAGAAAGACATATTATATGATCTTACTTATATGTGG
 AACCAAAAAAATTTCAAATATGACAGAGAGAATACAACAGTGGTTACCAGGATATGGGTTGTGGGCAGGAAATGGAGAGATGTAGG
 TCAGAGGATACAAAGTAGTATGAACAAGTATAGAGATCTAATGTGCAGTATGAAGACTATAGGTATGGGATTCATGCTAAGTGAGA
 TTTTAGCTGCTCTTAACATAAAAAAATAAGGTAACGTAGATGATGGATATGTTAATTGTCTTCACTACAGTAACCTTTTAC
 TATCTATATTAAGCCTATAACATCAGCTTGTATACCATAAATATACGTAATAAAAAATTATTTTCAAAATAAAAAAATACAAGATA
 10 ACTTCTCAACATTTCACTGTTCTAACACAAGTTCTTCTTATTACATGAGGCTTAAATGGGTGTGATGAATGGTAGGTGACA
 TTTTCTCTGGAAATCCTTCAGGAATTCAGATTCTCTCCATCTTGTAGTTTCTCCATCTTCACCATGTGACTCCAGAGTTACTG
 TGCTTGTGTCATCACATCAAGAGAGGGGGAAAAACATGGCAGGTTACACATGGAAGGTTTTTATGGAGTAGGCCCTAGAAATTAGC
 ATAGAAATTAGCCCTAGAAATTAGCATAATCACTTTCATTTATTTTCGTGGTAGAACTCAATCACATGTCAACCACTAGCTGCAA
 15 AGGAGGCTGGAAACGTTGCCAGCTGTGCACAGGAAGAAGACACTATAAGTTTCATGGAATAGTCCCTGTGGGAAGTGGGAGGA
 CACAGCTAATGCTATAGGCCCTGGATTATCACACTGTACGTTTATGTGAGATTTTTTTTTTCCCGAGGAGCTTCAACATTGAGT
 TCACTGGTGAAGTTGCTGAGAAAGCAGGTGGTTGAGTTGAAATTCAGAATTTGGAGGTTCAAACTGAATTTTAAAGTTGAAA
 ACTTGGGCAAGTCTCCGTTGGAAATGTCTTTTCACTGTTTCCGTACATTTTGGGGTGTATGAGAAGGGCATAGTCACAACATA
 TGTCACTCTGTGTGTGTGCTGTTTGGGGTCTGCACCTGGACACCAACCAAGGAGTGGCCCTCTCGTCTCTGCTTCACTTGGAC
 20 CTTTCAGTCGAGATAGTATGACTTACAGAGGGAGAGATGTTTCAAACCTGTGAACCAACCACTTGTTCAGATGAACCACTTATC
 TTGCACTTTTCTCTAATAACAATGAATGAACCTTGTGCTTCTAGCTAGTACCCTTATTCACCTGCTCTTCTGGTGGTATGCAATG
 CTCAATACATTTTGTCTTTTGCAAAATTTGTCTCATTGTGTTTCTTGTCTAAAGTTGGCTGTTTCTTCTTCCCTCTCTCTTC
 CTTAAATCATGTCAATCCAATCCTGGACAACCTGTCTCTCAGGCCCACTCAAATGCCATCTCTCTGTCTATTCTCCCATTT
 TCCACAGTTGAGTGCCTCTGTCTCTGACACTCTTGGGTTCTCAGTTTCAACACTCAGGTGGCCATGGCTGGCTAGTACTT
 25 CTGTATGAGTCTTTCACCTACTAGATTTAAACCTGTATGATAGAAGTGTGACTTCTAGTACTTACTTGTCTTAGCACAAATGTCT
 TACACACAGTACATTTTGTAGTAAACAAATGTTGAGTGAATGAATAAATATTGCTTATTGTGGAGCAGATAGAATGAAGTTTCAGT
 TTGGAGAAATCAGTCTGTGTGGCCACAGATCAGATGAGGAATGAATGAATGAATGAATGAATGAATGAATGAATGAATGAATGAAT
 AGGGGAGAAAGGCTGTACCGATTTTTGTCTCTAATGATCATAGAGATATGATTGTATTTATGTGGGCTAGAAAAGGGG
 ATCTCTATTAGGGCTCTGAAGTTTGTGAAGGCTCCAGCCACCATCTGATGTTGAAAAGTCAATTGATTGAGAAGGCTGATTT
 30 TACAATCTGACTTATTTTGGAGCGTTAATGGAGGCAAACTGAGATTGGGTTGGTTGGTTGTAGGGAGTATAAGTTATATCAATG
 CTCAGGGAGTATGTTTGTAGTTTGAACATTACAATACTTCTCAGGCTTTTAAAGATGTACATAAAATCTTGTAAAGTGGATGAT
 AATGAATGACAGAGACCTCTTATACAGCTAGAATATATCAAGTTGTACTTTTCTACAAATCTCCTTATAGATTGGGTTTGTG
 TGTGACTGTTTTTATGTTGTAGTTGTTTATGTAGGATAAAAGTCCAAGAGGAAATGTCTCTAAATATAAAATGATATATTCTAA
 ATATAATATATAGATACTATGTATAAGCTATTTTCTGCTCTAGGCTCTTTTATTTTCTTAAAGCCAAACATATTGTGTGTGATT
 35 CAAACAGGTAGAGAGCAATTAATTTAAAGGTGGCCCTAAACCCACCTTCTCTACTACTCTTGTAGGGGCTATTATCACTATATGA
 TCCAGGATTTATATAGCAGATTATTTATCACTACTCCCTTAGAGCAACCAATCAATCAGCTTCATTTTATAGGATGCTTAAAT
 TACCCATTTTAAATATGTTTATTTAATTTTTTAAAGTATTTTTTGAAGATCTAGGAAGATTCACATACTCATTTTTTTCATGAAC
 AAATATGCTGTATACTTAATGAGTCTGTCTGTAGGGATCATTTATTTCTATTCACTCAACTCTTACCAAGCTTCATACCTAGATA
 40 TTGAGATGATAGTCTATTGATTGTTTCTCTCTCATGTTTCTCTAGTATGCTTATCTTTTGGGGTTTATTTCTGGCCCTGGA
 GATCATCTTTTATGTGCTGCTCAGCTAGTTGTGATTGTTGCTTAAATACCTGCAATCAAGTTTATTAAGTGAATGTAGATAT
 TTTGAAACTATTTCTTTTAGGATACTAAACAGTAAGACAAAGATACATGCAAAATGTGTACAAAAGGCTCTTTGGAATATGAC
 TCTTTTGTAAAAGCAATTTGTGCCATGATAGTTTAAAAAATAGTTCCGCAATGATGTTTCAATTTAGTACTATGTACATACTG
 45 TTTTGTAGCAGAGAGAAAGTTTTTATATGACTAAAGCCCTCTGTGTAAACCACTTCAAGGTCAAAATAGAAATGAAATGAAATGAA
 GTGCTGTGTTTTCTCTTAAATACACTTGGATTCTTCCACGAGGTATATTAATAAGCTTGTGACATCAATTTTCTCTGTAGTT
 ACCCTTTTCACTTAGCTTGGTTGGAGAAAATTAACCTTCAATACATGATACAGAAAATCTGTTGATGACGCTTCCCTCCAGTT
 CTTAGTATTTAATTTATGAGGACATAGCACTTTTCCCATGTAAATACAGATTGGTAGAGTTGAGCAAGCTTAAACCTTCCG
 50 AAGTTTAAACCCATCAAATGCAGATACCTCTTCAAGGTATCTAATTTCTATATCGAAAATAATTCTAATTATCAGTTTACTTG
 GCAATCTGCAATAATAAGTCTTTTCAAGTTATCTATGCCCAGTTCCCTCAATTTCTCATAATATAGTTCCACAGTCAT
 TCTGATCTCACTCTTTTGTCTTCTCAGTTTATCAGAAAGTTCTTAAAGGTAGTGGACAAATATAGAAAGTACCTCTCTTTT
 TTTTGTAGGCAAGATTTCACTCTGTATCCAGGTTGGAGTACAATGGCGCAATCTTGGCTCACTGCACCCTTCACTCCAGGC
 55 TCAAGCAATCTCTGCTCAGCCTCCCAAGTAGCTGGGTCTCAGTTGATACACCATGCTAGCTATTTGTGTATGTCTGTG
 AGAGACGAGTTTGGCATGTATCCCAAGCTGGTCTTGAACCTCTTACCTCAAGTGGTCCGCTGCTTTGGCTCCCAAGCTTGG
 GATTATAGGCGTGAGCCACTGCACCTGGCCCTAAAGCTACTCTTCTGAGCAGTTTGGAGGGAGTGTGGCTTATCTGGCCCTGAG
 AACAGTGTCTTTATTAATGCAGCCTAAGAGTACATTTTGCAACCCATCACTGCTGTATGAATCAAGAGGCTGTGAGCCT
 60 CCATGTACTGACCATACAGGACCTCACATTGAGCCTAGTAACTTGACTATATTCAATTTGGTCTATTTTAACTTGTGAGAAC
 TTTTGTAACTCTGTTCTGGCATCCCTGGTGTGTGTTTTTATACCAATACAGCTTCTGGATCATTTGCTCAATCATTTGATAAAA
 TGGGCAATACAGACTTCTGTCCAGAGTGAATCATATCCATTACTTTTGTCTTAGATAAGAGTGTGTGCTGTGATCATCTTTG
 CCTGGGAAGTTGAATGATAAAGCCAGAAGAAAGCATGCTTTCTGATCATTTGAAGTTTACTTTTAAAGAAAGAGACTAAAAAAT
 65 TTAGCAGGAAATTTAAATTTTATTAATATCATCTCATATCTTTAGAAGATCTAAACCTGTTAAAGAAACAAATAGGTTTACACT
 GGAGCCTGGTTATAACCTTTCTTGGTAGCCATAGCTGTGGGGCCATAGCTTTGGGGCCCAAGCTCTCTTGTATTGTAGTCAG
 AGACCTTCCCATGTGCCCAGGAATTTGATTATGGCAGGTGATATTATCAAGTCTTCACTAGATTGGCTGGAGGGAAAGCTGTC
 TGTCAACAAGTTGTGGAATCTTGTATTGCTAAAGAGATACCCGGGCACTTAAACCTGGTGCCTTATGTTATTGAACTTTA
 AAATATTGTGATGTTTGTGTTGCTCAGGCTGGCTACTCCAGTTTGTGTAACATAGTGTGCTCAGACCATGGTTGAAGTTTG
 70 ATGCTTAAAGGACAGTGTATTGTAGCATAGTCAATTTCAAAAAAATTTGTTTTCTTCTCTCTCTCTCTCTCTCTCTCTCTCT
 CTTTCTGTCTTGAATCTGTGGATTGAACTTTCCACCCCTGGAAAAACAACTCAGAAAGTATATCATGTGTCATCATCATCTCT
 TCCTTTTATCAGTGCAGGTTTATAGAAAGTGTCTCATATCATCTCTGAATCATTTCTACAACTATAAAACAAATTAACCTTTCCA
 TTACAATCTTAACAATTTGAATAAATGCTCCTATTAGAAGCTTTTACTTCCATCTGTGAAGTATATCATGTGAGGGGAAAGTTG
 GTTTTAAAGGAAAAAATTTCTGAAGCAAAAGGTTCTCTCTTTTTTAAATAGTAGCAAAAGAGTGTGATTAAAGATGTGTC
 75 AAGCAGGTGCTGGGTATGTGCTAACTAATGGTTTTCAGAGTACTGAGTGGCTATTTTAAATGTTTCTATATCATTTCTCAGTTAA
 GCTGCTGGATGAAAGTACAAAGGCTAAAAATTTTACAGTTTCAGTAATGTCTGTTTTAAAGAAACCATCCGCTCTATGGCC
 ACACCCACTGAAGTGCCTGATCTGTCTAAAGAAACCATCTGTGTGATTCTTTCTTATTTCCATTGAAAGGAAAGAAATTT
 ATGGCTTACAGAGAAGTGGTTGAAGCAGTTTGTCAACACTGAGGTTTTAGGAAAAAATGGCCATCAAAAGGACAGTAAGTTGG
 GTTCAAACTCATCAGGATTAAAAAAGGTTGATTATTTCTTGTACTATATTATTACTATTTTGTATTATTAACTGT
 AGTTCCAATGAAATAGTATTATCTTTGAAACTTTTGTAGAGTTAGGAGACAAAGTTGCTGGTATCAGATTCTGGGCTAT

AATAATAGTGCCTTCTGCTAAGGTTGTTGTGATTAAATGAGATGATGCTCTGCCTAACATGGTAAGTACTCAGTAAATGTTTGT
 ATGCTTATTTTTTTCATTAAAAAAATTTTTGGTTAAATGAACACATTATTTCTCTAACCATTTTTTGAGTATATACTCAGTAAAT
 ATTAGCTATATTTACATTGTAGTGTAAACAAATCTTTAGAATTTTTTCATCTGGCAAACTGAAATGTTTATTATGTTTTAAAGCTC
 ATTTTTCTTCAGAGTCAGTTACACAGCTGTGTGGACGTAAACAGGAATGCAAGCACCATTGGGGCAGGGAGTTAGACTCTTCTG
 5 TTTACTGCTGTATCACAAGTGCCACAATCAGCATCTGGCCATAACAGGGCTCAATCAATATCTGTGGAATGAATGAATGAATGA
 TGAATGAACAGTGAGGCTTCATTGACAACTACATGTGTGTTTGAATAATTTCTTAAATGGTAAATCCATTTTTATGAGTGAT
 TTTAAGTATACATGGAAGTTGACTCCTTTTCGAGGGGTGAAGTGATTCTAAAAACAACCTGTTTGTAAATTTTAGCAGTTCTGGC
 TTTGGTAGGTCAACTTTTCTTAACTGGAAGAAAAATAGTATTCTTAGTGTAGATTGCAAAAGGAAAGAGGATATGTTAGATGAT
 10 TTGCCCCAAATTTAAACAGGATTTCGCTTTTTTAAATCAAGCCTTTTGTCTTCATTTCAGATCTGGTCACCAGACTTACTTTTTCT
 TAAGGCATATATGAATCATCTGTTCTTTCATTTCAGAAATCAAAAGTTTCAGGCTAGATCAGTATTTACCAAACTGGTGAACAC
 TACCTTTCCACTGAGAGTGCAATACCTTTTTTTGAGTCTTTGAAAGAAATGTCAGCTGAACATGGTCTGGAAGTGGCCAAACTCT
 GTGGGTGGGGAGAAAGGAAGAAATAACCTATCTCCCATTTAAAAACCTACCACCTATTAAATAAACGGCAGTCTTGTTCTGTGGAG
 TATTCATTTGGGTTATCTATTCTGATGAACAAATACAAATCTTGGTAGGGTTTCTTGCTCTGGATAAAATGCTTAGTGTGCT
 15 TTTTGTGTTTCAATCTTAGGTTTGTGTTTCAATTTGTTTTCAGGCTCTCACTCTGTCAACAGGCTAGAGTGCAGTAGCGCAATCA
 TGGTTCGTGGCAGCCTCAGCAGCTCCCTGGGCTCAGGTGATTCCCCCAGCTCAGCCTCTCGAGTAGTTGAGACTATAGGCACGCAC
 CACCACACCCCTGCTAATTTTTGTGTTTGTAGTAGAGATGGGAGTCTCACCATGTTGCTCAGGCTGGTCTCGAAGTCTCTGGACTCGA
 GTGATTTGGCCCATTTGGCCTCCCAAGTGTGGCTTACAGGCATGAGCCACTGCGCTGGCTGTTTTTATGATATGTATTGAA
 ATGCTCCAATAGCATTTTATTTTTTAAACATTGCTGTTAGGTAGTTGGCAGAAATGTGTCTTATGCCAAAGTTTACTTCCTT
 20 CTACCAAGGAAGGGGACTCTGTCTCTGGACTTTGCAAGTATGGGAGGAAGATGACAGGAAGCTACATCATCTGCCAGGATTTTT
 ATGGGGCCACATCACAATCAGTGCCTGTCTGTAACTAAGAGCAAGAGCACATCTCTCTTTCAGCTGATGTTTGTAGCAAACTCAC
 TCTGCTCCCATGGCAAGACAGTCACTCATCTTCAAATTTGGTATCTTGAGTCAATTTCCATTATGACTTGTCTTCTGAAAGTG
 ATAAAGGAACATCATCTACCTAGTCAATTTTTCCCATTTCTACAGCAAGAAAGTTTATCTCTGAATCAAGAGCATAAATCTCTGTT
 GCCTCTCTGAGATAATAAAATATTTTTATATTTAAATTTCTGTTTAAACAGGAAGTATATAAACCTTCCCAATTTTAACTCCT
 25 TCTTTGATTTCTATACCTACATAGGTTTTTATTTGGATTGAAACCAATAAAAGACCGTTTTCATGGTCTGGGCCCTTGGGACAGG
 GTAGTAGTGAAGCAGCCAGTTCAATTTATCTTCATCTGCCCTGCCATGGCTTCTGTTGCACTAAGAAATCAGGCTCTCTCCCGGA
 GTTGGTGGGAGTCTGCTGACCTGGCCCGAGCCAGCTCTGCGCTCATGCAAGCAATTTTCCCTTTCAGTCCCATACACCACT
 GTGACCAAGTGGCAGCCAGGCTCTTCTGAGGCTGCTTTTCTCCCTGAAATGCCACCCCACTCCCACTTTTCAATTTTTCTAACTCT
 CGTTTCATCTTCACTTGCATTTTAAATCACAATCTCTGAGAAGCCTTCCCTGATCTCCACCTTAAATGAGCACCACCCAGTTGTC
 30 CATACTTTGCTTTCTCTTTCTTTCCAGCCCTTATAGAATTTAAATTTCAATTTGCCCATACTATTGTTTCTTTAAAGTTT
 CTCTCCCATTAGTCTATAGGCCATTAGGGATCAGGCTATTTTGTCTGTATGTAATATCCACTTCTAGGACAGCAGGACACA
 CTCAGGAAGAGTTATTGAATAAATTTAAAAATATTTTTTATTAATGAAAAATATAAATATCCCAATTCTAAGAAATGTGCAAT
 CTGTCAGGAGTGTAAAGTACTGAAAAACGACAGCAGATTAGTTAAATTTGGTTGATTTCACAAACATCTGTAGATTGTTGACAGTGC
 35 ACTATGATGTGCTGTTCTAGGTGCTGAGTACATGTGGACGGTGTGCTGCTGCTTGGCAGAGGTCTCACTTGGGGAGATAGACA
 AGAGACACAATGAGGAATAAAATTAGTGCCTTTCTCTCAAGGAGCATATGTATTCTTCATGTAAACAAACATTTGTTGAGCACCTA
 TGATATACTCTAAGCTAGAAGACACTTGAATGTGATGAGTATAACATATAAGAGAGTAAATTAATCTCCAAGAAAGATACAGAAT
 TGTAGTAGGATGAAGATTAAGAAATGCTGTCTGATTAGGGACATCAGAGAGCATCTGGATAAAGCAGAGCCGAAGTCTACTTG
 AAGAATGGGTTCAACTTTGACAGCTGAAGCTATGAGGAGGAAATTTAGGCATGGGAACCACTTGGGTAAGGCATGGAGATGGG
 AAGACATTCAGGGATAGCTATTAAACCTTTTAACTGAAGCATAGGGTGGATGATGGTGAATAAGAAAGAAATAGACTAAAAAG
 40 TAGGTAGAGGCTATACCTTTAGGGAGTGAAGAAATCTCTTAAGTTTGAAGAAAGTTGATTAAATTAACCTTAAAGCAGTAAT
 GGTACTAATATTGCTGTTTGGTAGCCCTTAGGAAATGATCTTGTGACTTGGTACAGTGGCTCACACCTGCAATTCAGCAGCTTT
 GGGAGATTGAGGTGGGAGGATTGCTGAGGCCAGGAGTTCAAGACCAGCCTGGGCAACATAGCAAGACCCCATCTCAAAAAA
 ATAAGTGTAGTGTGCTGCTGCTAGGCTGCTGAGTCCAGCTACTAGGAGGTTGAAACAGGAGGATCACTTGGCCAGGATAGAGA
 45 TTGCAATGAGCTATGATGACCACTGCACTCCAGCCTGGGTAAAGACACCATCTCTACAAAAAAGAAAGAAAGAAAGAA
 ATTGATACTTGTTTAAATATATTACATGTCAATGTACTACAACAGTCTCTCCAAATGAGAATATAAAGAGCTTCATCTTGTAA
 ACTGCACTGATGTTCTCGTTATAGTGGTAGTTAGTATGCAGGTCAATAATTTATATGTGTTCTTGTCTTTTCAATTA
 CAGTAAAAACCGTAACTGACATTTGAAGGTTTTTTTTTCACTTTGTAATATCAAAACCTTGATTGTAACAGTATCTGTAAT
 TACAAGTATGTTTTTATGATATTTTAAAGAAATTTTATAGGACTTTAAGTCAAGTTCTTTTGAATCTTCCCATGCTCTA
 50 CCTAACAATTTTAGTGTAAAGTTTCATTTTCTTATCAAAATCTATGTAAGTGAAGCATTTGTTTGGCAAGGTACCTGCTT
 TTAGGATGATCTGTTTCTAGAAAAATTTGTTTGAATATGATTTTGAATATGATTTTGAATATGATTTGTAATATGTTGACCTTT
 GCTTCAATCACCTTAAATAAATTCATTTATATCTAATTCATATTTTATAAATCTAATTTTATATGACTCATTTTTCTT
 GAAATGGGGGTAATCTACAAACAATAAAGAGGTAATGATTTTTTTTTTGGCAGTTTGTACTAAGAGAACATGTTTATTTGTTT
 55 GGGTAAGTATGATCTTAAATACACTGTACTACATAGCAATCAATAGGGAGGAATGTAACGCATTTTCTTTGATGAAAT
 TGTGAAACCTATCTTAAAGAGTTTGAAGCAGAAATGAAGGATGAGCCTGAGGTTTCTGATTAGTTGGAGAAATTTGTTTCTAG
 TAGACAACAGTAAGAAATAAAGTGAAGAAATGTAATTTAAATGATGTTTATAAATTTTCAAGAGTTGATGTTCTCATTTTACAC
 ATTATATCTATAAAGTACAGTAATCAACTCTGCTTTTAACTGTTTGTGAAAGATTATTAAGGTTCAAGGGAGTGTAGTAGAGG
 CACAGAAAAACAGAATAAATTTGAATCCTAGAGTTTATGTGCAATTTAGGTAAATTTGACTTAGTGGCTCTGGCTCTCACCAT
 60 CTGGGTTGAGTGAAGGACCACTGTTCAATGTTTCCAGCAGTAGTCACTCAGACCAGCTTGGCAGGTTATCAGTCCCACTTAACT
 TTCTGCTGAGTCAAGGACCTCTCTCTCTGATAGCTTCTTGTGCTGACATCTTTCCACCCCTTTGTGCTGCTGCTCTGCACTG
 CCAGCCTCTGTGATGAATGAGGCTGAGGCTGAGGACCTTTGGAGAAATTTCTGGAGAGCAAGTTTTCATAGATTTTGTGCT
 AATTTTTCTGTTTCCACCTGTTACAAATATTTTAAATCCAATATGAAAAATCTTTAAATTCAGACTTCTCTGTTTCAAAATCA
 65 GACTTCTCTGTTTCAAAATCAGATTATTTCTGATCACTCATAGCTAGTTCTTGAAGTTTCTAGCAGGAACAGAGCTAACTA
 AACTACTGAATGATGTAATGAACATATAAAGGCTATGTTTACCTACTTAAAGAAATGCTTTTAGCCAGTTTGAAGATGCTGCTT
 ACTCTTTGTTTTTAAATTTAAAAATTTCTCAGAGATGGGATCTCGTTCTGTCAACCAGGCCGAGTGCAGTGCCACCGTCACAG
 TTTACTGGTCACTCAGCCTCTGGAGTAGCTGGGACTACAGGCACGCACCAACACCTGGATAATTTTTTAAATTTTCTTGTGTA
 70 GAAACAGAGTCTCTATGTTGCCCTGACTGCTTGAACCTCTGGCCTCAAGTGATCTCTGCTGCTTGGCCTTGGCCTTGAAGT
 GATTACAAGTGTGAGCCACTGAGCCTGGTTGAAATGTCACCTTACTTTTAAATGAATGTAATTTTAAAGGAAGAGTTTGAATGCT
 TTAATAATTTTCACTAGTTTACTTAAAGGACTAAAGCCTTTTTTTTTTTTAAAGACAGAAATCTCACTCTGTCAACCCAGGCAGG
 ATTGAGTGCATGATCTCAGCTGACTGTAACCTCTGCTTCCAGGTTCAAGCGATATTCTCCCACTTCCAGCTTCCAGTAGCTG
 75 GGATTACAGGCACCTGCCACACACCCCGCTAATTTTTTGTGTGTTTTTAGTAGAGACAGGTTTACCATGTTGGCCAGCTGCT
 CTCGAACTCTGACCTCAGGTGATCTGCCACCTTGGGCTCCCAAGTGTGGGATTACAGGCGTGAGCCACCACTGGCTTAA
 GCCTATTTTAAAGCATAATTTATATTAGGTATTGTTTAACTCTTCAAGGTTCTGTTTGGTTAAATTCAGAGCTTAAAGGAAGATC
 ACTTGGAGCTAGAAGGCCATGAGGGTGTAGGCTCAGAGGGGGCAATAGAAGCAGCTTTTGGGAGGAGTCAAGTGCAGTAG
 GTAAACATGGGATGTGTGAGATATGATACCAGCAGTGGTCCCCATAGCACAGGCAGCAAGTGTGAGGCACAGCAGAGCAGATG
 TACACGAGTATTGTGTGCTGTGTGCGCATGTGTGCGGTGTGAAGGGGGAGGGGGTGGTGTGCTGTCAGGTGAGCAATATACCC
 AAATGGAGCCCCAGAAGCAGCTGATACTAATCCATCCAAGTAGGCAGCATGTCTGTCCATGAGAAATGTTGGGCCAGCATTAT

CCAAGGATTCTAGACCAGATTCTGGAGAGATCACAGCAGAGTTTCTGCTTGACTTCACTGAGCTTCAGTGTGTAATCTGTAATAA
 GGAAGCAGTAATAGTAATACCTCAAGGGGTATTTTGATGGCTAATTGAAACATGTATGCGAAGCCCTGGAATACCATCTGGTA
 CATAGTAAGTATTTAGTAAGTGTAGCTATTACTGTATTACATGAAATTTGGGAAGACAGTATTTCTTTTAAATGTCCTATAAATA
 ACCGGGTGCAGTGCAGTACCTGTATCCAGCACTTTGGGAGGCCAGGCAGGCGGATTGCTTGAGGTGAGGTTCAAGATCA
 5 GCCTGGCCCAACATGGTGAACCCCTGTCCCTACTAAATTTGCAAAATTAGCCGGGTGTGGTGGCCATGCTGTTATCCAGCTAC
 TCAGGAGGCTGAGGCATGAGAATCATTGAAACCCAGGAGATGGAGGTTGCAGTGAGCTGAGATCATGCCACTGCACTCCAGCCTGG
 GCAACAGAGCGAGACTCTGTCTCCCAAAATAAAAAATAAAAAATGAATGTCCTATGACTGAGGTTTATTGCTCCTCAATTGAGCT
 ATTCCAATCAATGAAATTTTACTACATAAAGGTAGATGCCCTTCTAATGGTTTTCTTCCACAGGGATGGTGGGGTGAGATGGGGAA
 CTGTTTCAAGGTAGTAGACCTGTTTATGAGGAAAAAACTATTTAAATGCTGAGAAAAAGGATGCTAGCTTTTGGATCCATCATCAT
 10 TTTTGCCAAATTCATAGAATTTTGGCCAGTGGTGTCAAACCTTAAAAATTCATAGGAAAAAGAGATTCAATATTACTCTGTAATA
 TTAGGGAGGGTGTGGAAATAAGGAATGAACGTTATGTAAGACCATTAATGCTAGTCAGAGAATGTTCCAATGGAAAACTGATGTTT
 CCTTCTGCCACCAGGACAAAACCTTTTGTGATCTAAAGGCAAAACAATAACAAAAACAGCAACAGCAACAAAAACAGCCTAACAGT
 CCCAAGTGGTCTTCACTGTGATGATTATTAAGCAATTTTCTCAAAGTCTGAACCTACAGTTTGTGGAGTTTCACTGAAAAATGATA
 TAAAACAAATTTGCTTAAAGTAATAAGTGTATTATGGCATCAAAAGATCATAGTCACCTTCTTAAAGATTTGCATAACCTTTAAT
 15 GACTGTAAAGGATTTTAAAGACGATCCTTGCAGCTAGTATTATTAATACATTTTGTGAGGCTGTGGAAATCAGATAATTTGGGCCG
 GGCACATTGGCTCAGCCTGTAAATCCAGCACTTTTGGGAGGCTGAGGCGGGCGAGCACCTGAAGTTGGGAGTTCAAGACAGCCT
 TGAAGTGAAGAAACCTTGTCTCTACTAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAA
 TCCAAGCAGCTCGGGAGGCTGAGACAGGAGAAATCGCTTGAACCTCGGGAGGCGGAGGTTGCAGTGAGCCAGATCAGCCATTGCAC
 TCCAGTCTGGGCAACAGAGCTAAACTCCGCTCAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAA
 20 CAACCTCTGAATTTTGTGATCACATTATCTTCAAGTTTAGTTAGAACCTGAAGTTAACTGTCTTCACTTAGGTAGATCATAAA
 TAATGCACTGGTCACATTGTGTAGATATTAAGTTACACTTTGGTAGATGGATTTTAGATATTGAAAAATGATAGATTGGTACAACT
 GCTTTGAAAGTTTGGCAGCTTCTTATAAGCTCAAGATAGGCTTAACTGATCAATTCAGCACTACGCATCTAGATGTTTACCCAAA
 TGAGTTGAAAAATTTATGCTGCAGAACCACTGCTGATGCGAATCTTGATAGCAGCTTTTATTTATACTGTCAAAAACCTGGAGCAAC
 TAAGGGATCTTCAATAGATGAATTGATAAATGTGGTACATCCAGATAATGGAATATTATTGAGCACTAAAAAGAAATGAGCAAT
 25 GAAGCCACAGAAAGACAAAGGAACCTTAAATGCAATTTGCTTAAGTGAAGAAAGCCAGTCTGGAAGGCTACATACCTGTACAGT
 TAACTATAGAAAAGGCAAAAGCTCAAAACCATAGAGACAGTAAAGAGATCAGTGGTTGTCTAGTTTCAAGGAAGAGGGGACAGTGA
 ACAGGTGGAGCAGTGGATTTTAAGGCTGTGACACTATTCTGTATGATATTGTAATGGTGGATAGATAGGTGTGTCAAAACCCA
 TACAACCTGTGTAAACATAAAGAGTGAACCTTATGTAACTATATTTAGCTGTTTATGACTAGTTAACTCTATATCATCATTTGGCTCAT
 TAATTATAACAGATGTACCATACTTGTGCAAGATGGTTAATAACAGGGGAAACCGGGAAGAGGGAACCTTTGGCTTAGTTTCTTA
 30 TAAACCTAATACTGCTCTAAAAAATAGTCTACTATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAAATAAAAAA
 CAATACTCCAAGACAAAACAAAACAAAAGCCTTGTATAATGTCTTTCATATAATATTCCCAACCTTATTCTCTAGTTGTTTTTTA
 ATTTTTTTTTTCAATTATCTTATGTGTTATCTCATCAACCTTTAGTAACGGGCGAGTTAAAAAATAAGCACTTTGGCACTTCTGT
 GGCATACATTTCAAGTTGTGAGCAGAGTGCCCACTGATGTGCTGAGGAGTGTCCCTCTCCCTAGCCACACCTCTCCCTCTTTTC
 CACCTACCTTAGCATTAGTTGTCTCTACCTTGTCTTTGACAACAGACAGGGTGAAATGTGGGCTGTGGCCATTGTGTCTAAATG
 35 TTTTATTCTATGTATTTTTTAATCCTTACAGCAGTTCCCATTTTGTAGATGAGGAATGAGAGCACTGGAAGAGAGGAAATTCCT
 ACCCTTGCAGTCTGACTCCATTCTGATCCTCTATCAGGCTAATGTGGAACACACGTGACTCTCTGTCCCAAGCTTCTGTGAG
 TAGGTGGGAGGGGAGCCATTGAGGATTGGTCCAGTCCAGGTGCTATTTAAGTGAGCGGTGATTTTAGCTGTGTGAATAC
 CACCACCTACAGGCTAGTGTCTGCCATTGAGAAGTATCATCTCATTTTTCAATCTATTAAGTGATACATTATCACATTATTAT
 TATACCTATATATTATATATATATCTGGAACCATATAAATTTTAGTCAACTCTTTTTTTTTTTTTTTTGTGAGTTGAGT
 40 CTCGCTCTGTCAACCCAGGCTGGAGTGCAGTGGGGCGATCTCGCTCACTGCAACCTCTGCCTCCCAAGTTCAAGCGATTCTCCTGC
 CTCAGCCTCCAAGTAGCTGGAGACTACAGGCGCAGCCACCAGCCTGGCTAATTTTTTCTATACTTTTAGTCAACTCTTAATTT
 CTAGCCTCATATTGACAAGTGATAGGGTTCAAAAGTAAATCTGTGTGGCTTTGGAATAAATATTATATTATTAATG
 GAAGTTAGCAGATTAGCTTCTAATAATGTTGGCTGGAGGCGATTTAACCTTTGGTGTGTCTTGTGGCTGCAGATGTTTG
 TAATGCAAGAGATAGGAATTTGGTCCCTAGGAGGGTAAAGCTAAGGTTCACTCTAAGAAAGCCAAAGCAGACAGTCTACATGTT
 45 GAGGATTAATGTTGATTTTACGTGGGTATCATTTTTTAAAGTCCATTGCTTCTTATTTTGTGATGAATTTAAGATTTGAA
 GTACATCTCCTCTTATTGCTTTGTAGTTCTTATGAGGAAGAATCCCATTTATAGTGGGGCTGAGGAGATAACCATTTATTTTCGT
 TATGCTGTGTTTTCTAATATCGTAAGCAGACAAATAGCAGGATTTAATGAAATACATCATGAATTTAATCTAGACCAAGCAA
 AGTATTTTCAAGTATTTTCAATTTTCAATAAATTATATTAATTTCAATTTAAGTTAAAAATTTTGGACAGTTTACTTGAAC
 ATAGATTGCTTCTCACTGATGTTAGAAATTTTATAAGTTATTTTGCATTCTTAGGAGGCAAAATAGGTTTCAAAAGGATTA
 50 ACATGTGTTAACTTTTGTATTTTCAATTAATAAAGATAGTATTGGAATAATGAGTATTTTCAATTTACTTCCAATGTTTGT
 ATTAACCTTTTTTGAACCTAGTAGATGACTAGTACAAATAGAATTTTAAAGATTAGGATATACCTGTTACTTGTAAAGTGAATTT
 TTTTAACTTTTAAATCAATAATAAATAATATCTGTTTTTGTATTTTCTGTAACAATATAGAAGTAGTTCTCAGATTTCTTGTCT
 ATAAGATGAATTTTATGATCTTTATTTTACTTGGCAAGTCTAAATAGTGGTGGTTCTGGGGTTGATTGATGTTTCTGTTTCT
 ACTGTTTGGCTAATTTCTGTATGTGTTTAAATTTTTTAAATAGCAATATATATTTCTGTATGTGAATAGTCAGCGTGTGTGTGT
 55 GTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTATTCCCGCCCTTACTATGGAGATCATGCATGTCACTGCTGAGCTTGGG
 GAAAACAGAAAAACAAACGTGACCTTTGATCCCTTCAAGATAACATAATCTCTAGTCATATAAAGATAAGTCCATCTCTTAGT
 CATATAGACAGGATTTATATCTTAGTCATGTATGGCTATATACATAAATATGTGCATATTGCCAGAGATTATAAGCATGTACAT
 GCATACATAAATAATTTTAAAGTGAAAGAGAAATCCTCTATAACACCTTACAGGGTGGCTATGTTCTTTTAAATGTTTCAAGGGG
 ACCTTGTGTAAATTTAGAGCCAGCACCTGGCTCAGGTTCAACCATGACATTTTCACTGATCTTTCTGCTGTTTTCTAGTTGACC
 60 TTCAAAACAGAAAGTTTATAGCCTCTTCTCAGCTGTTAATGTGATTACTTCTTATGTCTGGGAAGTCAAGATTGTTGCTGAATTC
 TTGTTTTAAGGGGATTGAGTCTTGGTTTAAATGCCAGGACATCCAGCTGACAGAAAACTAAATCCGCCAACTAATTTCAAA
 GATTACCAGGTTTGGGCTCGTGGACATCTTAGATCTAGGTGAGCAACTCTTAGGCTGTTCTGGCACACCACATACATATGGG
 GTTGTGTATGATTTAATTTCAAGTATCATTTTAGCATTGATTGGCAAAACCCCTAGTGGCTTTCAGTCAGTAAAAATTCAGTGAC
 CAGTAACTCTGCTGCTGCTCCTGCTTAAATCAGTATTGAGTTAGTGGTGGTTAACTTTGCAATTTTGACTCTGTGTAAAAAT
 65 GTATACTTTTCTTAAATTTTCAAAATAGGAAGTGAGGTGTGCTCTCAGGTTCTTGGGCTCACAGCAGGAGGTTATGAATATAA
 ATGAAGGAGACACTAGATGAGTCCACACAAGGCGATATCAAACTCACTCCCAAGGAAGGAGCAGATCATATTCTTACAC
 CGTGAGAAACAGCCATCTTGTACAGGAAATGAGATTGAAGAATTAGTCTGATTAAAAACAAATACAGAGTTGCTGTTCAAGT
 AGGTGGCTGTGAGAAATTAGCAGCTGTGGTTGGAAGCCATCAGGAGTTTCTCTCAAGCAAGACCAAGCTGAGTTTCTTAGATCC
 CTGCTGTGTGTCCAGCCTGTTTTATGCTTCAACCCCTCACTTTAGCTTTTTCCAGTAGGAAACAAATGGCAAGGTAGAGGAAG
 70 AGTTTCTTAAATTTTCTTATTAGGAGTGAGTTTTTTTCTTGTAGATATTAGTAATCTAAAGTAGAAGTAGTGTAAATTTTTT
 TACAGCATATAAATCAATTTGCAATCAGCAGTTGCGCTATCTGTATATGCAAAATCTTAAGAAATTTAATATTTTATCAAAAGCC
 ACAACTCCAAAAATGAAATCTAATGACTTGTCTTATGGTAACCACTATCGAAATATGTCTAGCCAGTGTGTGTCTTCCATAAT
 TTTCTCTAAGAGTTTCAAGGAGTTTCAATAAATTTGCTTTCCCAACATAGATAGATGATCGATCGATCGATGAGAGAGAACAGATAC
 ATTTTCCCTCAATGGGTTATGAGACTATTAAATTTCTTTAGCTTCGTATAGAGATGACTTCACTTGTAGCATGAATG
 75 TATTGGCTAAGGGACAAGCCTATTGTTTTATAAATTTAGTTTAAACAGTAATAAGCCAGGTTAGTAAATTTCTAAACAGG

ATTAATCTTGCTTCATAAATATTTCTGGTATTATATATGGAACCTGTTGGATTGCACACACATTGATTCTAGAAATGACCCATGT
 CCTTTTAAATTTGAATTCATTGCTGTTCTTTGAGACCTTGTTAGATTTCTTTATGCTCGTCCACCGTTGCTTTGTTATCTA
 CCAGGGCGTTGAGTGTCTGTCACCTTGATGGAGTTCTGACCTGGATTGATCAACATCCCCTTGTCGCCCTTTCTCTTGTGTCAGA
 5 GGTGTGTTGCTGCAAAATCAATGAAAGTCACAACTTATTTTAGAGATCTTGACATTTCCAGCAGGTTTCATTGAGAAAGCTG
 ACTACAGTGTTCAGAGAGTACAGAAAGATTCATTGCAATTTACATTTAAGAGAAAGTAAACTATTGTTTGGTAAATTTTCA
 CCAGTCTCAAGGCCTGTGATGTCAAAAAACAACAGATGTGGTCAGATATCTAGTGATATAAGTGTGCATTACCCGTGAGTATTA
 ACATTATGGCAGGGTTCATGGAATTCCTGGTTACATTCAGAGGGAACATTTGTAAAGTAAAGTGGCAGGAAATAGATACTGAG
 10 GAAATAAACTACACTGGGTCTGACAACCTGGAACCTTCAATTTAGCCTACAAAGTTGACAGACAGGCTAGGATGTCTCTGAACCTG
 TTAGATATGGTTGGTCATAATAACATTTAATTGTTTGGTGGAGGGGATGACTATTTAACTTAAGGGCCCTCTCTGTACTTTCA
 AGCTCTCCCAGATTTCTAAAACAAGAGCACTGGGCTGGGCGCAGTGGCTCACGCCGTGAATCCCAGCACTTTGGGAGGCCGAGGTG
 GATGGATCGTGAGGTGAGAGATCGAGACCATCTGGCTAACACAGTGAACCCCATCTCTACTAAAAATACGAAAAATTAGCCGG
 CGCTGGTGGCAGGCGCTGTAGTCCAGCTACTTGGGAGGCTGAGGACAGGAGAATCGCTTGAACCTGGGAGGTGGAGGTGTGACGTG
 AGCTGAGATTGGCCACTGCACCTCCAGCCTGGGCGACAGAGAGAGACTCTCTCAAAAAAATAAAGAACATTGGCCCTCTCTGAGT
 15 CCTGGAGAAATGGGTTGTACAAATTCACAGTGAATCATGGACATAGTATAAGTGCATGTAGTTTCAATTTTAATTTGTAGTCTC
 AGTTCTTTCAAGAAAGTAGCTGAACAGTGAAGGACAGTCTTCTATACAGTGAGCTAAAGTAAAGTAGCTTCATGGAATCAGGTGG
 TTTCAATCTCTGAAATCCAGAGACTCTCTTTTGGCTCCCTCATCTATTGCCCTGTGTTGAGGCTTTACCAITTTCTCTCTGAGC
 AAACACAGGAAACTCTTTACCTGCCTCTGCTTTGACATATGCCCCAGCCCTTGGTTCTCTTCCATAGTCCCAACCAATGTTT
 TTTCTAAAGGCAAACTAAACATCATGGCATGACTTGTCTTAAATCTTCCGAAGACTCTCTTCTCTTGAAGGTGTCTAAATCC
 20 CAGAATGTCTCAGACCTATGTATCTTTCCAGTCTACTCTTTCTGTGCCCTGGGTAACCTGTTGCTTCCCAAGTGTCTTGTGCTAA
 TTGTGTGAATCTTTCTGGTCCCACATGCAGGCTGAGGCTCCCTCATGGCTCAGGTTGTCTCTGGCCATGCTGTTTCTCTA
 ATCGTTAGTTGACGTGCTTCTCTCACTAACTCTAAAGACATTTTGAGCACTGTTTATGTGCTTGTCTTGAACAAATCTGA
 GCCCAGCACCTGGCAGCTAGGTGGTGTCTCAATAAATGTTTCTTATATGATTGAATAAATGAATGAAGGAATGAGTTAGTGATATCA
 CACAGGAAGCAGTGGTGAAGGAGACACTGCAATTTAGTTAGTAAACAGGCTTGAGCTGCAATTAACAGATTTGAGCAAGAGTGAGG
 25 CTGGTTGGTTGTCTGGTGGCCCCCATAAGGGCATAGCCCTGGTGAATAGCCACAGGACCAAAATCAGTTTATTAGTTCTTTTGA
 GAGATGTGACTTGAAGAATGACTTATAGTTAAATTTATGAGAGATTAATTCATAATGATATGCTCATGTATTTCTGACAAATGA
 AAAGAGGAAGGCCAGGCAGCACAACAGTGAATGGTCTTTGCTCAGGCCACATCTGCTGGTCAGTAAGTTTCATTGAGGAGGCCCA
 ATATTAGAATCTTAAATCTGAGTAAATGCATCTTTCTAATTGTCTCTAAGGATTTGCTCATCAAGCTGGATTACCCAGAAGA
 AGGATTTATTTCTTTCTTCTTAAATGTTTAAATTTAAATAAATTTTATAGAGACAGGCTCTCACTATATCCGCCAGGCTC
 30 AAACCTCTTGGCTGAAAGGATCTCTTTGCTCCACTCCAGTCTGAGTGGGAACTACAGGCTTGTGCAACATCCCTGGCTTTT
 TAGTTGAAGGGCATTCTCTATAGATCACTGACTTTTACAACATCTTAAACAGTAAATCAAAACAGTTCTACCTTTGTAATAAAT
 GGCTAATCTTGAATGTTTACTGTGTTGGGCACTGTTCTAATGCTTTATCTACTTTGACATAATCTTCAACACCTGTGATGTAA
 TTACTATTATTAGCTCTGTTTTTACAGACTGGGAAACCGAGAGCAAGATGTTAAGTGATTATCTCTGTTCTAAGGGGTGCTGGA
 ATTTGAACCCATGCAGATGGACTCAATACCTTTGCTTTTAAACACACACTAATCTTCTTTCTATGAATGCAACAGCATTTCTTG
 35 TGTGTGCTTTGTGACTTCGTTTAAATGCTCCTAGCAACTCTGCAAAATAGGTGTTAAATCTCTTTTGTCTGAGCCGAAAAAAG
 GTCTTGGTTTTTGGTTACAAGCAACGGAATAAGAAAAAGATTTTACCATGCTTTATACCTGAGCTATCTTTAGGTGAGGTTG
 CTGACTATGATGATGGGTGCCAGTGGTGGTGGGAGGGGCACTTTTCAAAAGGAAGGGAGGCCAATGATGAGCAAAACAAAT
 CACATGAAGAAATGGAAGTTTAAATGACTTGGCCAGGTCACCCAGCTAGTGAGTGCCAAAGGTGGGATTGGCCCTAGGCTGCTC
 CTAGCACCATCTGGGTTCACTCTGATTGAGTGGACCTTTGCAAACTGTACATCTGCTGCTGCTGTTCTTTCTCAGCAGGTTA
 40 TGCTATCATAACTAATACATGATCATTTCTTTTATTTCCATTCTGGTTCTAAGAATACACTGTGACCACTCTTTTGAACCTGGCT
 GTTTCCCAAATGATAGTGACATTTGTTTATTTAATCTAACTATCTTTTAGGATAGTTGTATAAACAGTTTGTCTCATCTAAAT
 TTTAACTAAATTTGACTGCTTTCCACTCTGAAAGTGACCTTTTCTGACCTGGCTGCAAAATCTGAGGAAGGCTTGACTGA
 AGCTCTGTGAGCAGACAGAGCTTTTCAAGGCTAAGGTTTATACAAACATTGACCTTCTAGGAAATCTGTTCTTGATCACTTG
 45 GGTAAAGCAAGTAAGTTTCATGGGAATGCCATCTATTCACTGTCAACTCACAGCCCTACTGTACAGGTCTTGTCTGGGAGCATGCT
 CTCTGGAAGAGTGGCTTATCTTTGCACTTCTGATCTGTTTGTGAGGAAATGACAGTATTTTCCGCACTTGACCAACCAATGAA
 CGCTGATCTTTGATGTTTGTGTTTATCTGCTGCTCATCTTACATCAAAACAGAGGAAGCCACAGGAAATGCTGCTGCTGTAT
 TTCCAGGAACTTAACTACATCATCGGCTCCCAATCCGACAGCCAGAGACCCCTGATGCTGGCTCAGTGTGCTGATGTGGG
 TGGTGTAAAGGGGCGAGAGTGTCTCATCTGTGGCTCTGCCAGTGAAAGCCTAGAAGAGATGAAGCACTCTTCACTAACAGG
 50 AAACCCCTGAGTCTGTTCTATAAGCACTTAGTCTCTGAACATGCCGACAGTGAGGGTGAAGTGAGGGATAATTCTATCCCAAGGC
 TAGTGGTCTCTTTCTTCTGCTCAGGTGTGCTATCTTGTCCCTGGTCCATAGGGCCGCTGGCTGGCATTCTCTGATCACAGAAA
 ATTGAATGATCTCTGGGAAATTTGTACATGAGCCTGTGGATGGGGTCAAGAGAGATAAAGACCATAGGATTTACACTGGCCACCA
 CGAGTCTCTCAAGAAATTAATAACATAATTTGTAATACCAATCGTGATATTTATTGAGCATTGACTTTGGTGTGCCAGGCATT
 55 TGTGAGGACCCATAGAGCATTAAATGTAATCTCACAATAACCCCAAGGAGTCTTTATTATCCCAATTTCTGAGGCGAGGTAC
 CTGAGACTCATAGAGTTTGATACCTTGTCCAGGTCATATAGCCATTAAAGGATGCAAACTTGAACCTAAATCTGTGTCTATTCTA
 AGCCAGCACTATACATAGTCAAGTAGGTTTTACTGGAGGGTGGAGTGGGGCTGGCAGCTGTGTGCACAGGCAGAGCGGAAGCAGAC
 AAGATCCATCCAAGGCAGGCTGAAGACTTATACCCAGAGAAGGCTTTGGTGTACATCTGCCAAAGTGATTTCTCATGTAGAAGAA
 60 AGGATTGGGTGATAGTCCAATAAATACTTTACCAAGGGAACCTTATGTGTCTTCTGGGGTCTGGCCAAAGTCATGAGTGCAAGCTC
 CCAATAAAAAAAGGTGGCTTCTCACTCTCATGATCCAGCTTCTAGCATAGCACTCTTCTATTTTGTGTTATCAATTTCC
 AAATGTGATTGAAAACAGTATGAGAAATGATGTTGCTTCAGCTTCTCTGTGAACCTGAAAACAAATCTTGTGAAACATGATATCT
 65 CCTGCTCATGGATCAAGAGGGATGGTCTGGAAGAGAAGCCCCATAAATATTGAGGCTTAATGAAGGCTATCTGTTGAATAAT
 ACACCTGTATTATTGTAAGAAAGTTTAAATTTGGCCTCAGAGTACTCCCACTAAAGCAGACAAACAAAAGTGAGAAAATGAGGC
 TAGGAATTAATAAAGATGTCAAGAAAGACCATTTAAGGACTCTTAGAGACAGGCCATAAATGTGGTTTGAACCTTTTGGCAGC
 TATTATGAAGACGGAAGAGAAGTGTCTGGAATCAATTTTCAAACTTAAAGTTCTCTTAAATTTAGCAGAAAAATAGTTT
 70 GCAGCTCTACACAGGTATTGGCTAGCATTAGTTTAAAGTGGTTGACATGACGCCCTACTGCACACCTCTTTATATTTCCCTTTGTGT
 TAGGATTAGAAAACTCACATAGTATGATCTATCATATGCTACTCTGATTTTCAAGATTGATAATCTGGTTGTGTATTA
 TCTTGGTCTTCAATTTCTTCTTCTTCTGCGCTGTTGGTCTACTACTGACATTTCTTTCTTATTAACATTTCTGCTAAATTTTA
 AACAGAGAAAAGAAAAATAAATACAAATTCAGCTATTTGACAGAGGTGATTTCAATGCTTTGTGAGCTTAAAGGGAAATTTCAAGAG
 AGATCTTTCTACATCAGTCTACTCATAATAGAACCTCTGGCTATCTTGGTTGAGCCTGCTGACAGGTGTGCTTAACTGGGCCAC
 75 AGATTAAAGGCAGGTAAAGGAGAAACCTGACAGAGGTAGGTTTGAACCCATTATACCTAAGATGAAGGTCACTCTTGTGAATTG
 ATATAGAATGTGAAAGGGTAGAACTGCTGATTAAACAAAGTGTGTTGATTATCTGGATTTCAGTAATAAGTGTGTTCTCTCT
 TCCAGTTATAAAGAGTTGAAAACCTTGCAAGGCACCTTGATATAATGTGTCTTAAAGGTTTATAGTAACGGTTGGGCTTCTCTC
 TCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCAGACCAATATATCATGTCTATTGAAAGTCTGAAGATCAGTACATATTTCT
 CCTGTTTGGAAAATAAATAGCTAGGTTTCACTAGAATCTTTTATCTCCAAGGCTCTCTTAAATATTGACTAATTAATAAATA
 ACTAAGGAAGCTAGCTAAATAGCCTCACTTTGAGGACAGCCAGTGGACTAGAAATACACAGTGATTGTGTGATCTCTGAAAC
 AAGCACTAGAAATCTTTTATTATGGCTATAATAGCAAGTGGCATCTCTTATTATGTTTGGCAGCTGACATTTCAATTTGCAATTT
 75 TGSTTGGTTGTTATACATGAATAGTAGGATATGAGTAGACTAAAAATGAGAAATTTGAGCCAGGGATGACATGAATATCTAACC

374

375

376

HUMAN SEQUENCE mRNA

CGCGCGCGCGCCCTCGCCACCCCGCTGCCACTCCCGCGCGCCCGCTCTCGCTTTCCCGCGGCTCCCTCGCCCCCTCCC
CTCCCCCTTCCCGCGCACTCGGGGGCTGGGAACGAGCTGCCATGTGATCGCGCTCCCTCCGCGAGCTTTCGGTGACCCACGAA
30 CTGCCCACTCTCGCGGCTCGCGGGAGCGGGCTGCGAGCGCGGAAGACGCGGGAGAGGAGCGGAAAGGACGCAAAAGTTCTCCG
GCGAGCGCATTCATTACATAGCTCCGAGTTTAAACATTTGCCCACTACTGAAGACATCATTTGGGACCAAGCTGATGAGCCCT
GAGACACAGCAGATAAAGAGTGTGTCTGTGTATCATTTTGCTGGGAAGTGAATGATAAAGCCAGAAAGAACATGCTTTCTGAT
CATTTGCAGCTGTCTGCTTCAGAAAGTGAGGGCTCCAGGAATGAGGAGAACTTCAAGAACTTCTCTGCACCTGTGACATGTCTGAT
CCCTTGTCTCCCATCCCTGCAGCATGAACAAGGTGACACTCTGACCTGTCAAGAAGTGGCCCAAAAATCTTGGGCTCCATGT
35 CTGAATGGATTGCGACAGCTTCTCATCTCTCTCCCTGCCGAGTTCCTGTCATCTTAAGACTCGAAGGACGACAGAGCTGGAAA
AATTACATGGTGTGAACCGCATGTCTGTGGATGAGAAGCCTGACTCCCCCATGTATGTGTATGAGTCCACAGCTCCACTGCACCAAC
ATCTCTCTGGGCTCAATGACCCAGCGGAAAGGATAATTTCTGTGACGTGACTTTGATCGTGGAGAGGAAGGATCTCGGGCCCA
CCGGGCTGTGCTGCGCGCATCGAGTAAATATTTTGGCAGGCGCTGGTTGGACAGACAAAAATGATTTGGTGCTCAGTTTGCCTG
AGGAGGTCACAGCCAGGGGCTTTGGGCCGCTGTTACAGTTTGCTTACATGCCAAAGCTGTTACTCAGCAGAGAAAAACATCCGCGAG
40 GTATCTGCGCTGTGCTGAGTCTCTCGGCATGCAACCTGCGAGGACTCTGCTTTCAGCTTCTTTCAGACCCAGCTCTGGAACAGTGA
GGATGGCTCTGTTTGTGTGCGGAAGAGCTGCGTGCGGACGCCCAACAGGAGACTCGAGAATCTGTGACAGGAGGAGGAGGATG
AAGAGGAGGAGACGATGGATTACAGACAGGCCAAGATGGCTTGCCCGCCAGGACCCAGATGTCTCAGAGCCCATCAGCTTTGAGGCC
CGCGCCATCTCCCGTAGCAGAGAGGAAGAGGCCCTGCTGCCCGAGCTGACGTGCCACAGACCAAGGAGAGCTCAGAAAAGGA
CGCGTTAACGAGTACCCAGATACAGAAATAACGACTTGATGATACCAAGAAATGCTATAATGCATCATCACAGATGCTCAG
45 GTTTTGAAGCACATTCGCGGAAGATAACTCTAGCAACAGCCTCAAGCCGGGGCTTGCCAGGGGGCAGATTAAAGTGAGCCGCCC
AGTACAGAGAAATGAGGAAGAGAGCATCAGCTCTGCTGTCTGGAGTAGAGCTGCAGCCGAGGACAGAGCGGGGATGTGCGAGAT
GGACCGGAAACAGCCCGCCGCTGCCCTTACCCCAAGGCCCGAGCTGGGGCGGCTGCTGCTGAGAGATCAGAGCGCTGCGCTCGC
CCTCTGCTTAAGGTCTCTGTTTACGCATAACGAAAAGTGTGAGCTGTCTGGCTGCCAGTACATCTCAGCAGCATTTTGCACAG
50 AGTCAGGCTGCCCTTTTTCAGAGGGGATCATCAGGGTGACCTTAAACTGAGCTACACCCCTTTCACAGGGAATTTAGACAGCC
CCAGTGGGGCAGAAAGGAGGTGTCCAATTTACATTTGAGGTGCGCCCTCAGGGGCTCGGTTGGAGGCTCTCTGTAAACAGGAGG
GAGAGCTGGACCGGAGGAGCGTGATCTTCTCTCCAGCGCTTGTGACCAAGTGAGCACCTCGGTGCATTCTTATCTGGGGTGAGC
AGTTTGGACAAAGACCTCTCTGAGCGGGTGCCAAAGGGCTGTGGGTGGGAGCGGGCAGCTCCCTCCCGAGCTCGAGGCCATCTC
60 CACGCTGGGCTGATGGCCAGCACTTGCCAGGAAGATGCGGCCAACAGCTGCCCGGTGCCAATCAAGTGTGCTGCTGCTGCTGCT
CACCCCCCTTGGAGACCAGGACCAGGACTTCCAGCTCTGCTCTTCTTCTTCTTCTACGCGGAGGACGGGAGCGGGGCTCACCTGC
AGCTCTCTCTCTGTGAGTTCTCTCTCGCCCTGTCTCCAGGGAGCGAGATCTCTTGCCACAGAACTCAGGAACCCAGGCGGTGAT
GGGAGATGGAATGTACCAAGAGTGCGGCCAAATTAATGTAGAGCATTTATGGAACCACTCAGTACGCAATCCGATCCGATCGT
70 TCTCGGAAGCAGACAGTGAGTCGTGCTGCTGTCAGGACAGGGGCCAGGAGGTAAACTTCTTTTCTCTGTAGATCAATACAGAT
CTTCAAGGAACGATTTCCAGATGATGATTAATAAGCAAGCTAAGCTGAGACAGTTAGAGTTTATCATGATGTCCGAGCGGC
CAGTACAGAACCGCATCGGCCCGAGCGCTGCCGAAAGGAACTGGACTGTATCAGAATTTAGAATGGAATCCGCAAAATGG
TGTTGTGAGAAAGAGAACTGTTGTGAGAGGGAATCAACTGAAAGCATGCATGGGGAACTGTTGGACAACCTCTCTGCTCTTTC
CAGGAAGTTTTCGAGACATCAGAGCCCGGAGCAGATCGAGGCCCTGCATCGGATTTGGCTGCTCTCAGACCCATGGACTGCC
CAGCGCTCTCAGTATTAACTCTGCGCTTGGGTGTGAGCAACATTCGGCGCTCCCAATGCGAGTGGGGGAAACGTGCCCT
GCTGCTGGAGCGGCGCGGCTCCCCCGGACCCCCCTGGGCAACCCAGCAACCTCCGAGAATTGTACCTCTGGGAGGAGACTA
75 GAAGGACTGACCCGGGAACCTTCTCAGAGAGGAGACCTCTCTGAAACCCAGGAGCCAAACAGTACCGTGGAACTCTGCGGAC
AATGACTGATAAGTGTACAACCTGACGAACAGCCAGGAAGATTATACCTAGTACTCGGCTCTGCTCCAGTCCGACACCTCTA
CCCTCAGGCGCTCTCAGTACGCTGTGGACTGTTCATCTGTGCTCCGAAAGAACCGAGAACACATTTGGTGCACTACAG
CGGTCTTAGCAGCAATCTGTTCCGAAGTATCTCTCTCTCTCAGAGCAGGAGTGAATGTTACCTTCAACATGGTGCTACCCCTT
GCCCAGGCAAGGAAGACAGCAGTGATGACACTGTCTGTGCTGGCTCAATTCAGTCTTACAGGATAGACTACAACCTCTA
GGCCCAACACAGGATTTTTTTTCTAGTGGCCGTGTGACAAACCTATTCAGGAATTTCTTGAATGTTCAATTTTTTTCAT
80 TGAAGACAGCTTCTATACACATCAAAGTTTATAGCTAGACTGTACATATATATATATATATATATATATATATATATATAT
TATATATCCATATGCAAAAGCTCTGCATGCTCAACTTTCTCATCTCAAACTGGAACTTATTTCTCAATTAGAACAACTTCA
ACATTCCTCTCTTTTGTCTGTGATGCTAGAACTAGTTTGGTAAGTGTAAACGTGGTCAATTTTCTGCTTCAGAGTCAATTTTC
AATTCGTACTTATTTATGGAACAAATTCAGTGTGGAAGCTTTTCCCAAGGTTTATTTTCAGATTTCTTTTTCGTTTGGTTTGGT
TGTGGCACTCCAAGTGGTGTCAATTTGAGCATGTAGGTTTGTGTTTTTGTGTTTGGGGGGTTTTGTTTGTGTTTTTGTGTTT
85 TGTGTTTTCTCTCAGATATGTACAGTAATGTTCACTTTGGCACTTGCAGTGTGTTGGGTCAAACTATTTCTTAATAGAG

TTGTAACCTCGGTATAACTCAAGTATACTGTATATTCTTTGCTTTTAGTTAAAAAGTAAAAACATTTTAGCTAATTAAGCACT
 CAGGTGATAATTATGTAGGAAAAACAATCTTGCCAAATATGAATTCATCTAGGATGTGTAGACAATATCTGCTTGATATTTT
 TATATTTACCTCCTCCCCACCTTTCCCTAAGCAAGTTTAAACGCAGATAGAGAGTTTCAAGTTGATGCTGGATGTTTCAAGTTCC
 5 TAAGTGGGAGAGAGTTTGGACATCTCACTCAAAGTACATCAGAAAAACAGGAATCCGTGATTTTATACCGAATCAGCAGGCA
 TTGGCTCCTAGAAATCAAGTTAGAAAGTTTTCACCCAGGGAGTAAGTCCCATTCATTCAACACGTCCTGAGGCTCGGCTTGCTC
 TTGGAAGTGGTGTGAGTAGGACCTGCTCCCTGAAGGACGGGGCCAACAGCCACTGGCTTTCTGCCCAGGCTTGGCTCCGAC
 GACATCTGGCTGAGGGGATTGAAATCAGAGCCCGAAGGTCCTGCTTCAACCCATTGGGAGAGAGCAGGGCATCTCGCATCTG
 10 CGATCCATCCCTGACACAGGCTGACACATTCTTCTCTTCTTCTTCTTCCAAAGGCTTGGAGTTTCTTCTGAGGTTTTCTGCCAG
 TGTCTTGTCTGAAGGCAGACTTCATTCTGAGGCTTGGACAAGCTATTACCGGGAACCTCCCTGTCCTCTCCGAAATCACACA
 CATACCTTACCCTCACCTGATGATAATTTCTCTTCTGCTGCAAACTGGTTGGCTTGCAACCCAGAGAGAGCAGCTTCTCTTGG
 CTCTGGGGGCGGTGTGGCCCCAGCCACGTTTACAGGAAGGTGTGCCCCAGAGGAGGAGGAATCAGCTCCCTCGCTCCAGTGGCT
 TGGGTCGGGTCTCACTGAGCAGCCGAGGGCCATCCAGCCCGCTGGGGAAGAGAGTCTGAAACGGTTTGATGTGGGATGGGG
 TGGTGGGAGTGGGAATAGATGGTTGACTTTGTTTCTTATTGTGCCATTGTTTGACAATATTAAGCTGCATGTAAAGGGG
 15 AAATTAGTATATGATGTAGGCTAAAAGTGAATCATAGTAACATATGTTTGTAGTATTATTAACCTTTTCTGTACAAATATTAGCA
 CTAATGTTTAAATATGATGATGAATGCCAGAAATTTGTCACTCATGAGTAGGATAAAAAAAGGGCTTTTCT
 TTTTAAACAGTTCCACTTTTAAACAGCTCTGGGTTTTGTTTTTCTGTTTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT
 GTGTGTGTGTGTGTGTGTGTGAACAGATCTTGATAAAGCTCTGTGTGTGGAGCTGTGGTTTTTGTATGTTTGGAAATTTCTT
 GGCCTACTAGGACAGTTCTGTGCTTACCATGAGGTTTGCCTTTGTGAAAACCTGCTGGGTGACAGTGAGAATATAAATCAATGT
 20 GAATCAGTGATACCTCGGACAGGCTGTGTTACAGTGGAGTCACTGACAGTATTGCTTTTAACTCTATTGTTGCTTTTCCAA
 GTGACCTCTCTCTTCTTTTAAAGAACACTTTCTGCTCATATAACAGGTCACACCCAGCTTCTTCAATTTTCA
 CTTGGTAACAACTCATGTGCAACTGGTAGTCTTGACCACATTCATCCATTTCTCAGGTTTCTGTGTTTCACTAGCCAGACCTG
 TTTGGCAGCATTCTAGCAGGGGCGGGGCTTTTATTCTTCCACCTAACTCAGACCTCACCTTCTCCACCCAGCTTCTTCA
 CTTGCTTTCTCTCTTCTTCCCAACCTAACTTCTGCCATGGGAACCTGTTAAAAACACTGCTCTAAAAACCATCTTCAATTTCA
 25 TAGAGATTCTCACAAGTTATTTCATTCAATCCACATGAACAGTACTAGCTTCTGTGAGTTGTTTCACTGTGATGTGTGTGTGT
 CTTTCTCTATTCAAGACTATGTGCTTGTCAAATTTTCTGCGTTGATTCAAAGGAGGACTTCTGCGGGACAGAAATCCAAACG
 GCCTCAAGTGAATTTTAAACCTAGCCTGTCTTTTCCCTGGGATCCCTCTGTCAACCCACGCTTTTAGGAAAAAGAAAGT
 GAGTGAACAGCAAGGAAGAGTGTTCACAGTACAGTAACATTGGTTGTTTCTTAAGGCTCTTTTCTTAAAAAATAGAGACCT
 CCAACACCGGCTGTTTAGGAGGATGCCTGCTTGGGTCTCAAATGGCTGGGTAGGAATGGTTGTGGGGCAGAGCCAGTGGAGG
 30 TGAGTGACCTGAGACTAATGAACATCCACCTAAATCCAGTCTCCCTTGGATCTGCTTGTCTGCTGTGTATCCAGGCA
 CCTCTTTTCAAGTTGGTCAGGCTTTGGACAGGTGAGTGTGCTGTATGTGTTGTTTCTGCTGCTTAAAGATGCACTAATATG
 TAAATCGAATTTATTACATACTGATTCTGGAACAAAACAGTTAGAAAACTTAAACTTTAAAAAAGGAGCCGACAAAGTT
 ACGAGGCTCATCTGCTATTATCTTCTGAGTCTCCAGCAATGACTCAGGCATCAGAGATGATGCTGCACTGGAACCTGACTCTG
 35 TGTGCTGCAACTGAATGTTGTGCGAGTAATTTAATCTGCTTTCTAAAGGTTTGTGCTTTTAAAGATGCACTAATATCGGGA
 TGTAATCCTTACATTGCTTTTCAAGGAAGGGAACAAAGTCTAGTGATTAGTATGCCAAGTCCACTACTCTTCAAAAGGAGCC
 AGGACAGGCGACACTCATGAGAGGACTGGCTAAGTGAAGTGTGCACAGTGTGAAGTTTAAAGTGTGTGCAAGAGGCTTAA
 CCAACATTTCTCTTTTAAATTTTATGATTGCCATCAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
 40 TGTTAAGACACCAAACTCTGCTCCCGTGAAGTCTGTTGACATCTGTTGGAGTAGCATAATCTCTCAAATGAGGAAGAGCTGC
 CTGCAAGCTTTCTCAAGTCCCTATTGGCTACTACTTCTTACATTATGCCCATTTAACTAGGAGCTGTCTTAGAAATGACT
 TCAAAGTCTTCACTATTGCTTACAGTTTAGGAGGAGTCTGATCCAGAAAGGAGCAAGAAATCAAGTTTGGAAATGATAAGCC
 AAATAGACTAAAGAAACAGGTGTTTTTGTGTTTTGTTTTGTTTTTCTAAGAAATAGAGTGTTCGTTGTATCATGATTAGTGTTC
 45 TTCCCCAACTGAAGACTGTGTTGGAAGTGCAATTTCTGGTGAAGTCACTCCACAATAAATGCCCTGTGTGGAGTTGGTATCATA
 CAGGAATCTGTGTGCAGGAGGATGTGTGTTGAAGTGTATGTTTATAGTACTGCTGAGCCATCTCATGCCAGGCTCCAA
 AACCGATGCTGTAGAACAGAAATATCTGTGCAAAATAGGTGTGTGCAAAATAGCATTGTTACATAGAAAAGTCTATTGTGGCAGA
 TTGAGCATAAATATTCAACTGACGGTGCAAAACATTACTGCAAGAAAGTTTATAGTATTTCTTCACTCCACCTGGGAG
 50 ATGATATTTCTATCAATGAATATCAGTGCAATTTAAATGTAATATGAAAACGATGCTGCCATTTTGTGAAGATACCCACTGGT
 TGCAAGGCGCACTTTTATAGCTTTGATTTAATGTTGTGACACGGTGTATGCAATTTGCTGTCAAGCAATGGATAAAGCTCTGA
 CTTTCACTCTCATTCCAGTTTATTGACCTCAGATAAAACACTGGCCCTTCTAGAAGCAGAAAGTGTGCACCAAGACCACTTCAATTC
 AGGTAGACTCAGATTCACTGCAAGTGTCTCCATGGGAATAATCAGACGCATATGTTGCGAAAGAGTGAAGGGAGTTGGACAAGA
 55 GGGGTTTTCTTCAAGATGGATGCTCAGTCTTCTACCAAAACATGTTTGGAGGCGAAGTATGACCTCCCTTAACTTAACTGATG
 TATTTTGTGTGTGCAAACTCTGGGATGCCGTTTCAAGCTCTGACATAAAGACATGGGCACCTTAGTGAGTGTATCAGGAAGATTCC
 ATATGCAATTTGGGAGCTTCAAGTGTGTTTAGACACAGTGAAGCATTCAAGGCAAGCACCACCTTTGCTAGTGAGGCCAAGAGAGC
 CTGTGACAAATTTGACAATTTGTTCCAGAACCAAGTCTGATGCAAGTGACCTCTAATATATGCTTACAACTCAGAGGCTATATT
 CAAAACAGGGTCTTCTCAGTGTATGCAAGGGGCTGCAGCCCTCTTCTCTTCTTCTCCAGGTTGAACAATACGGACAGTTTCCACA
 60 CATATCTACCTGTATAACCTCTGTACCTCTCAATCTGTTCAACAGCTGTAAACAGGTTACATCAGGTGTTTTCTACATCTTTT
 TACACAGATTCTGCGATTAAATGTAATTTAATCAATGCTATTTTATTGTAAGTCTTCTAGGCTTGTCTTATTTTCTA
 AGTGATTGTGTTTTTCTCGTGGTTTTTATTGTAAGAAATGAAAGGCTGTGTGCTTATTCTGTAACTAAGAAATTTACCTTT
 TGGGGAAAAAGCATTGCTATGAATTAAGAAATGGAATTCATTACTCATTGTAATACACTATTGTGCAAAAAAGTTTTC
 65 ACTCAATGAATTGCTAGTGTAACTGAATTTGCTAGACACCATTTCTGTTGATGAAATAAGACATATCATTATGCAATTGTAA
 ACTG

HUMAN SEQUENCE - CODING
 ATGAGAAGCCTGACTCCCCATGTATGTATGAGTCCACAGTCCACTGCACCAACATCCTCCTGGGCTCAATGACCAGCGGAAA
 AAGSATATTCTCTGTGACGTGACTTTGATCGTGGAGAGGAAGGAGTCCGGGCCACCGGGCTGTGCTGGCCGCATGAGTGAATA
 65 TTTTGGCAGGCGCTGGTTGGACAGACAAAAATGATTGGTGGTCACTTGCCTGAGGAGGTACAGCCAGGGGCTTTGGGCCGC
 TGTTCAGTTTGGCTACACTGCCAAGCTGTTTACTCAGCAGAGAAAAACATCCGCGAGGTATCCGCTGTGCTGAGTCTTCTGCGATG
 CACAACCTGGAGGACTCCTGCTTCACTTCTGACAGCCAGCTCCTGAACAGTGAAGATGGCTGTTTGTGTGCCGGAAGGATGTC
 TGCCTGCCAGCCGCCACACAGGAGTGCAGAACTCTGCAGGAGAGGAGGAGTGAAGAGGAGGAGACGATGGATTACAGAGCGG
 CCAAGATAGGCTTGGCCAGGAGCAGATGCTTCCAGAGCCATCAGCTTTGAGGCGCGCCATCCCGTACAGAGAAGGAAGAA
 70 GCCCTGCTGCCGAGCCTGACGTGCCACAGACACCAAGGAGAGCTCAGAAAAGGACGCGTTAACGCAGTACCCAGATACAAGAA
 ATACAGCTTGCATGTACCAAGATGTCTATAATGATCATCACACAGTACCTCAGGTTTGAAGCAGATTCCGGGAAGATAACT
 CTAGCAACAGCCTCAAGCCGGGCTTCCAGGGGCGAGATTAAAGTGAGCGCCAGTGAAGAGAAATGAGGAAGAGGATCAGC
 CTCTGCTGTCTGAGATGAGCCTGACGCCAAGGACAGAGCGGGGATGTGAGATGGACCGGAAACAGCCAGCCCTGCCCTTAC
 CCCCAGGCGCCAGCTGGGGCCGCTGCTGGAGAGATCCAGGAGCGTGGCTCGCCCTCTGCTTAAAGTCTCTGTTACGATAA
 CGAAAAGTGTGGAGCTGTGCTGGCTGCCAGTACATCTCAGCAGCACTTGGCAGGAGTCCAGCTGCGCTTTTTCAGAGGGATC
 75 ACTCAGGGTGACCTTAAACTGACTACACCCCTTTCAGGGGAATTATGGACAGCCACGCTGGGCGAGAGGAGGTGTTCAACTT

5 CACCATGGGGTCGCCCCCTCAGGGGGCTGGGTTGGAGGCTCTCTGTAACAGGAGGGAGAGCTGGACCGGAGGAGCGTGATCTTCT
CCTCCAGCGCTTGTGACCAAGTGAGCACCTCGGTGCATTCTTATTCTGGGGTGAGCAGTTTGGACAAAGACCTCTCTGAGCCGGTG
CCAAAGGGTCTGTGGGTGGGAGCCGGCCAGTCCCTCCCAGCTCGCAGGCCTACTCCCACGGTGGGCTGATGGCCGACCACTTGCC
AGGAAGGATGCGGCCCCAACACCAGCTGCCCGGTGCCAATCAAAGTCTGCCCTCGCTCACCCCCCTTGGAGACCAGGACCAGGACTT
10 CCAGCTCCTGCTCTTCTATTCTACGCGGAGGACGGGAGCGGGGGCTCACCTGCAGCCTCCCTCTCTGTGAGTTCTCCTCCTCG
CCCTGTTCCCAGGGAGCCAGATTCTTGCCACAGAACATCAGGAACCAGGCCTGATGGGAGATGGAATGTACAACCAAGTGGCGCC
CCAAATTAATGTGAGCAGTCTTATGGAACCACTCCAGTGACGAATCCGGATCGTTCTCGGAAGCAGACAGTGAGTCGTGTCTTG
TGCAGGACAGGGGCCAGGAGGTAAACTTCTTTCTGTAGATCAAATCACAGATCTTCCAAGGAACGATTTCCAGATGATGATT
AAAATGCCACAAGCTAACCTCAGAACAGTTAGAGTTTATTCTATGATGTCCGACGGCGCAGCAAGAACCGCATCGCGGCCAGCGCTG
15 CCGCAAAAGGAAACTGGACTGTATTGAAATTTAGAATGTGAAATCCGCAAAATGGTGTGTGAGAAAGAGAAACTGTTGTGAGAGA
GGAATCAACTGAAAGCATGCATGGGGAACTGTTGGACAACCTTCTCCTGCCCTTCCCAGGAAGTTTGGCCGAGACATCCAGAGCCCC
GAGCAGATCCAGGCCCTGCATCGGTATTGCCCTGTCTCAGACCCATGGACTTGCCACGGCCTCCAGTATTAACCTGCGGCCCTT
GGGTGCTGAGCAGAACATTGCGGCCTCCCAATGCGCAGTGGGGGAAACGTGCCCTGCTGCTTGGAGCCAGGCGGGCTCCCCCG
GACCCCCCTGGGCACCCAGCAACACCTCCGAGAATTGTACCTCTGGGAGGAGACTAGAAGGCACTGACCCGGGAACCTTCTCAGAG
AGAGGACCTCCTCTTGAACCCAGGAGCCAAACAGTGACCGTGACTTCTGCCAGGAAATGACTGATAAGTGTACAACCTGACGAACA
GCCCAGGAAGATTATACCTAG

AATAAATCTTTAAACATTTTAAATTAACACAAAGTGCCCCAGGAACAGTAACCTAAATCTATCAGTCATTTCTTCTCAGAGTATAG
 CTTGGCGGGAAAGGCTGATCCATTCTGAGAGTCAAGCTCTTTAGAGTCAGAGTCAGGGAGTTAGTCAGAAATCATACTTAAAAA
 GCACAGGAGATGGAACAAAAGGTGCCAAAAGGTGGCAGGCCAGACCTAAAAGTCATTTCTTTCTGTGTCAACTCTGAAAAGGG
 ACCCCAGCCTGCTCTGCTGCATATCAGGCAGCCACTGAGCCACTGACGATGCAGAAAGAGTGTGCATAGGCTTGAAGTTCAAAAGG
 5 GCTGTAGAGTCTGGGGGAGGGAACATGCCCTTAATCTCAGTGGAGGACTGGAGGAAGAGAGGTGAGAAGTTCAAGGCTAGCTAAG
 ACCGTATCTTTAATTTGAAGCCAGCTGAGCTACATAAGACCTTATAGCAACAAATACGCAACAAAATCAAAACCAACAGGCT
 AGAAAGATGGCTCAACACTTAAGAGCGCCTGCAGAGGGTGGGGTTAATTCCAGCACACACATAGTGGCTCAGGGAATCTGAA
 GCCTCTCTGGCCACTGCGTGAATGCATGCGCATGATACATGTGCATACATGCACACAAATACTCAAAACACATTAAAAAAT
 AAGTCTAGCGGTGGTGGCACAGCTAGCACTCAGGAGGAGAGAAGCAGGCGGATGCTGAGTTTGAAGGCGAGTCTGGTCTACAATCC
 10 AAGTTCAGGACAGCCAGGGCTACTCTATCTCAGAAAACCAATAATCAAAACCAATAAGACTCCTCTACCCCCAAAAACAAAAA
 GCAAAAAATAAACAATGGGTTTGGGTTTAGCTTTGAGATAAGATTTTACTATGTATCCAGGCTGGCTATACTAGAACTGGTTACT
 ATGTATCCAGGCTGGCTATACTAGAACTGGTTACTATGTATCCAGGCTGGCTATACTAGAACTGGTTACTGTGTATCCAGGCT
 GGCTATATAGAACTGGTTACTGTGTATCCAGGCTGGCTATACTAGAACTGGTTACTATGTATCCAGGCTGGCTATACTAGAACT
 TGGTTACGTAGACCAAGATAGCCTCAGACTCAGAGATGTGACTCACTTGCTCTTAACCTCCAAGTGCTGGATTTACGACCGGTGC
 15 CACCAAGCCTGGTGTCCCAAGGCTTTTAACTCCTCTGCTCAGCCTCCAGGTTCTGGGACTGGCAGCATGTGCCCCACACA
 GAGTTGGCCTGGGATTTGTTTATTCTATTTTCACTAGTTATTATTGTTGTTGTTGTTGAGATGGGATCTTTTACATATCTCAGG
 GTTGTCTCATGTTTGGAGCAATCTCTGTATATTTATGTATGTGCTGCTGCATGTGTGTACATGCGTGTGCTCATGTGTGCTGT
 GCGTATGTGTGTGTGTATGTCTGTGTGTGCATCTGT
 20 GATCAAAAGACAAGTGTTTAGAATCAGGCTCTGCTTTTCATCATATGGGCCAGGAGATGAGGCGCAGCTCACCTGGCTTGGCAG
 AAACACTTGT
 TCCTGGAACCTCACTCTGTAGACCAGGCTGGCTCGAACTCATAAATCGCCTGCTCTGCTCCCAAGTGCTGGGATTAAAGGCGT
 GTGCCACCAAGCAGCTCAGCAACACTTTCTTTCATCTGCTGGGCTCTTCTTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT
 25 TTTGTTTGT
 TATGCGTATTCACTTTGTGTGGGAACGTCCTTGGAGAAAGCAGGAGCAGGAGTTACAGACAGTTATAAGCTGCTGACCTGGGTG
 CTGGGAACACCTCAGGCTCTTGGAGAGCAGTAAGTCCCTTAAACCAATGAACCACTATCCGCTCCAGCCTACATTTAAATTTGT
 TTTCTATTATTAATTTGTCTGATGTGCTATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCTGATGCT
 CATCCAGCGACGCTCGGGACTCATATCCTCAGGCTTGGCAGCAAGTGTCTTCTGTCTCCCTTAGTCAGGATTTCTCATGTAGCC
 CTGGCTGCCCTGCAACTCTCAATGTAGACCAGGCTAGCCTCGAACTCAGAGATCCATCTGCTCTGCTTCCAAGTGTATAGGTT
 TGAAGGCTTGCAACACCAAGGCTTGT
 30 TGATCTTCTGCTCCCAAGTGCTGGGTTACAGTCATGCGCCACCAATTCTGCTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT
 TTTATGCAAGCGAGGCAACACCGGTATCCAGTTCCTGGAATGTGGCTTTAATCATGGATTCACTTATTAGCAGGACCTGGGACC
 TGAAGCACTGCTTACCAAGCATCTCCTCTGTGAAATAGAAGAGAGGAGAAATATTAAAGTCTGGGAGGAGGAGGAGGAGGAGGAG
 GTGACAGTGTGCTGTGATAACCAAGCTGGCAGTGCCTCTGCATCCCACTTGGGAACAGCAGCTGATACTCCAAGGCTGCCATG
 35 ACCCTGAAGATCACTGGAATCAGGAGGAAAGTAGAATCCCAATGGAAGAGTTAAGGCTCTTGGGTAAGAGTGGGAGAGAAATGGGG
 GTGGGGGTGGGACACTGCAGAACTCTGGGAGAAAAAATCCAATAAACTCAGGAAACACATGGAGGCACAAATTTGTCTAATC
 TTTCTTTAAAAAACGTTTTCAGGAGATTTATTTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTATGTAT
 GTGCACCTGT
 40 CTGGGT
 TGTTCATCTTGAGTTGGGACAGTACGCTGGCGGAATAGGCTGTAACTCCAGCAGTCACTGGACCATCATGGTGTACATATTAA
 ACCTTTATGTAGGTAGGTCACACAGCAAGATCCCGTCAAAAACAGCAACAAACCAAAAGGAGCCAGCTTCTTCCACACA
 AGCATCTTTCCCTCAGGCTCTCAGCTCCATCTGACAGTACTCGGCTGGTGGTCTATCTTTCTGAGCCTAGTTGGCAGAGAAA
 45 CAAGCCCGGTTCACTCTCATGACTAGCACATCTAATGATAAGACACAGGTTGACTCAAGGTGCCATAGGTTGACATACCAG
 AGCGACAGATGACACCTATGAGTGCAGTCTGTTAATCAAAACACACACACACACACACACACACACACACACACTCATGC
 ACCACCTGCAAAACAAATTCAGCCTCTGAGCCTCTGTCACAGCCCCACCTCTCTCTGATACACTGCGTTAAGTGTGTGAC
 TGTATCAAAATGACTTCATGCTCTCCTGTCTGAGCCAAATTAACAATTTTGGAAAGGCTCAAAATGTCTCTGTTAGAG
 50 TTTCTGGATACCAATACACAGGAGCGTGCACCTCAGAACATGTACACTTTGACTTAATCTCAGGGGTGACACCCGACGCT
 TACACTCCCCCTAGCCACAGAGGCAACTGCTGGGCGTCTGAGTTTCTCACTGCCACAGCTCGGTTGTCTCAGCTACCTCCCT
 ACACCCACGCGCGGAATCCCTGACACAGCTCCACCATGCT
 TGGGTGAGGAAGTGTCTCCACGAGTCTGCTGCTAGAACCAACTTTATCTCTGCCATTAGAAATAGGGAAGAGAAGAGACCACA
 55 GCGTAGGGGGACAGAGGAGACGACTCTGAGAGGACAGCCCCACCGCGCGTGTGGGGAGGCAATCCAGGCTGCAACAGGTTG
 TCCCCAGCGCATTTGTCTCCGCGCCCCCTGGCGGATGCTGGTCCCGACGGGCTCCGACGCGCAGAGAGTGAAGGCGCGCGCT
 GGGAGGGCATCCCAAGGGGAGGGTCCGGCGCCAGTGCAGACTGTAGGGCGGGGCGCAGGAGGGGGGCGGGGCGGGGCGGCGG
 CGGTTAGCCTGTGAGCTCTTGTCTGACACCGGCAAGAGCCACAGCTTCTGCTCGCCACTCATTTGTCTGTGGCCCTGACCACTGCGCC
 CTGGTGTCTTTAGTGCCTCCCGGGGCGGAGGGGCGAGCTTCTCACTGCAGTCAGCGCGCAACTATAAGAGGCTATAAGAGG
 60 CGTGTCTCCCGCAGTGGCTGCTTCAAGCCAGCAGGACGCAACCATGCTGCTGCGGCCCGCTCCAGACTTATTAGAGC
 CAGCTGGGAACCTGCACTGCTGCTCAGCTCAGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
 CAGAACCAAGGCGCAGGCT
 65 CTTGCT
 GAGCCAGGACGCGGCTTACCAGCTCCACAGCTGTGGGATCACCACCTACAGACCCCTCTGTCATTGTGACTTCACTCA
 GGGTGTCTACACTAGAACTAGCTCTGCTGAAGTGGGGCACATCATTTGGCATGCAGAGCCAGATACACAGGCTCAGAGACCA
 TTCCCATTTAATAGCACCCGTTTCTGCTGAGCAACAGGTCCTCAACCTGCTGTGGTGGTGTGCTCAGGTTGCTCTTAGGTTCTGAA
 70 CCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAACAGATATTAGCTTTGAGGTGAGGGAGTGAATTCCTAAGTTTTTCA
 AGGTGGGACAGGCTGCAAGTGGGTTTCTCTCGGGGCTGACTGAAGAAAGGAGAGCTAAGGTAGCCATGCCTTTCTGTCTCA
 CTCACTAGACTCTGAGCTCAGGCGCAGGCAAGGATAGGCTGATGAGCTGATGAGTGTAGGATGAGGTTCCCTCCCTGGACTG
 75 AACCTTATGCTATCCCGCAGGGGCTGTAACATAGCTCTCTCCACGAACCTGTTGACGGATTCCAAGAGTCTGCAGCTGGTGC
 TCGAGCCAGTCTGCTGCTGCTGAGCCGCAAGCAGCGGCTGATCCGACAGAACCCGGGATCTGCAAGCGTGTGAGGAGG
 CTCAGAGCGCTGTGCGAGAGTGCAATGGCAATTCCGAACCCGCGCTGGAAGTGCCTGCTGCGGGGCGCCACCTCTTCTGCGG
 CAAGATCTCAACAGGTTGGTGCCAGGAAGCGAGCTCTCCGGATTAAAGGAAAGCAGGCTCATCTCAGGGCATGAGGCTGCGC
 GCGAAGGCGAGGAAGACATCCAGGTTATATGTATCAAACTGAGAAATCGCTGGTGTGCGGCGAGTTACCGTAGGTGAGCACCAGA
 TTTCTTCTAGCTTTGCTGTGTGAGCATGATCTTAACTGTGTGAGCACTGGCCACAGAAAGGAATTCCGAGCTGTGGCGCT
 GGGCGACAGCTGTTTTCTCTAGCTTCTCTCAAGGTACTGCGGAAGCTGATCTGAGGCTAGCTAGGTTGTGCTTCCGACCC
 AGCAAGTTTGCAGTCCCAATAGTAGCGATCTTGGCTATGCAGATTTGTTCTACTTGGGAATCTCCCTTGGAGTGTCTGCTG
 TTAGGCTCTGGAGTCTCAGTAAAGCTTAGAGAGGAGGCTTCCATGCTTGCACACATGACTCCAAGGATTTGGAGTGTAGGTT
 ACCAAGTCTTCAACAGGCTGTGAGTTGGCCCGCAGCTTCTCAACTGATGCGGGGTGCTTCAACCCACAGGCTCCGAGGAA
 ACAGCGTTATCTCTGCAATCACTCCGCGGGGTACACATTCGTTGGCGCTCTGCTCCGAAGGCTCCATGAGTCTTGCAC

382

MOUSE SEQUENCE - mRNA

60 AGTGGCTGCTTCAGCCACGAGCCAGGACAGCGAACCATGCTGCCTGCGGCCCGCCTCCAGACTTATTAGAGCCAGCCTGGGAACT
CGCATCACTGCGCCCTCACCGCTGTGTGCTCAGTCCACCGTGCGGGACGACGAACCAACAGCTGTCGAGAACCAGCAGACAGAACAGCAGAG
GCCAGGACGGCCATGGGGCTCTGGGGCGTGCTGCCACGCTGGGGTTTCTACTACGTGTGCTACTGTGCATGACCGCTCTGCCCCGAGC
CCTGGCTGCCAACAGTAGTGCCCGATGGTGGGGCATCGTGAACATAGCCCTCTCCACGAACCTGTTGACGGATTCCAAAGAGTCTGC
AGCTGGTGTCTCGAGCCCACTGTCAGCTGTGAGCGCGAAGCAGCGCGCAGTACTCCGACGAAACCGGGGATCTCCGACAGCTGG
ATGGAGGGGCTTCAGAGCGCTGTGCGAGAGGTGCAATGGCAATTCGGAACCGCGCTGGAAGTGCCTCCATCTGCTCGGGGCCCA
CCTCTTCGGAAGATCGTCAACCGAGGCTGCCGAGAAACAGCGTTTCACTCTTCGCAATCACCTCCGCCGGGGTACACATATCCGTGG
65 CGCGCTCTGCTGCTCGAAGGCTCCATCGAGTCTGCACCTGCGACTACGAGTCCGCGCGCGCGCTGGGGGGCCCCAGCTGCGCATGGGGG
GGCTGCAGTCAACACTCGATTTTGGTGCCTCTTTGGCCGAGAGTTCTGTGAATCCGGGAGAGAGGGCGGAACTTACGCTTCTCT
CATGAACCTTCACAACAACGAGGCGAGGCGAAGCAGCCGTGTTCTCTGAGATGCGCCAAGAGTGCAATGCCACGGGATGTCGGGCT
CTGCGACGGTGCAGCTGTTGGATGGCGGCTGCCACAGCTGCGCGCTGTGGCGCAGCTGTCGCGCACCGGCTTCGACGCGGCTCC
CGGTCTTTACCGAACCCGAGGCGAGCAACCGCGCTCGGGCGAGGTGCTGCGCTGGAGCCGAAGACCCCGCGCACAAAGCC
70 TCCCTCCCCTCAGACCTCGTCTACTTCGAGAAATCGCCCAACTTCTGCAAGTACAGTGGCGGCTGGGCACAGCTGGCACAGCTG
GACGAGCTTGCAACAGCTCGTCTCCCGCGCTGGAGCGGTGAGAGTGTGTGCTGTGGCGAGGCCACCGCAGCGCACCGCAGCGT
GTACCGAGCGCTGCAACTGCACTTCTCACTGGTGCTGCACGCTCAGCTGCGCAACTGCAGCAGCACGCGGCTTTGACGACAGTG
TCTATGAGGTGCCGCGCTCCGGGAACGGGAACGCTCTCTCCAGTCTCAGACACACTCGCTGGTCTGATGTTTGCCACCCCTA
CCGCGTCAGGCACAGCTCCAGGGTTTCATAGGCTCACTCTCCCACTCTACTCTGGGAGTCTGAAACCACTTGCTGATGTC
75 GGCTGAAACCTCTTTGCACTCTGAGGCGCTGACCCAGCTACTCTCTCTCTTTGAGGAGACTCTCTTTTGCACTGCCGCC

- AATTTGGCCAGAGGGTGAGAGAAAGATTCTTCTTCTGGGGTGGGGGTGGGAGGTCAACTCTTGAAGGTGTTGCGGTTCTGTATGT
 ATTTTGGCGTGTGACCTCTTTGGGTATTATCACCTTCTCTGTCTCTCGGGTCCCTATAGGTCCCTTGAGTTCTTAACACGACACC
 TCTGGGCTTCAAGGCCTTTCCCTCCCACCTGTAGCTGAAGAGTTTCCGAGTTGAAAGGGCAGGAAAGCTAAGTGGGAAAGGAGG
 TTCTGGACCCAGCAGCAAAACCTACATTCTCTTGTCTCTGCTCGGAGCCATTGAACAGCTGTGAACCATGCTCCCTCAGCC
 5 TCTCCACCCCTTCTGTCTGCTCTCATCACTGTGTAAATAATTTGCACCGAAATGTGGCCGACAGAGCCACGCGTTCCGGTTA
 TGTAAATAAACTATTATTGTGCTGGGTCCAGCCTGGGTGTCAGAGACCACCTCACCCACCTCACTGCTCTCTGTTCTGTCT
 CGCCAGTCTCTTTGTTATCCGACCTTTTCTCTTTTACCGACTTCTCATAGGCGCCCTTGCCACCGGATCAGTATTTCCCTTCC
 ACTGTAGCTATTAGTGGCTCTCGCCCCACCAATGTAGTATCTTCTCTGAGGAATAAAATATCTATTTTATCAACGA
- 10 MOUSE SEQUENCE - CODING
 ATGGGGCTCTGGGCGTGTGCTGCCAGCTGGGTTTCTACTACGTGTCTACTGGCACTGACCGCTCTGCCCGCAGCCCTGGCTGCCAA
 CAGTAGTGGCCGATGTGGGGCATCGTGAACATAGCTCTCCACGAACCTGTTGACGGATTCCAAGAGTCTGCGAGCTGGTGTCTG
 AGCCCATCTGCTAGCTGTGAGCCGCAAGCAGCGGGCTGATCCGACAGAACCAGGGGATCCTGACAGCGTGTGAGGGGCTC
 CAGAGCGCTGTGCGAGAGTGCAATGGCAATTCGAAACCGCGCTGGAATGCCCCACTGCTCCGGGGCCCCACCTCTTCGGCAA
 15 GATCGTCAACCGAGGCTGCCGAGAAACAGCGTTCATCTTCGCAATCACTCCGCGGGGTACACATTCCGTGGCGCGCTCTGCT
 CCGAAGGCTCCATCGAGTCTGCACTGCGACTACCGCGCGCGGCTCGGGGGCCCCGACTGGCACTGGGGGGCTGAGTACGAG
 AACATCGATTCTTGGTGGCTCTTTGGCCGAGAGTTCGTGAGTCTCGGGGAGAAGGGGCGGAGCTACGCTTCTCATGAACCTTCA
 CAACAACGAGGCGAGGCGAACGACCGTGTCTCTGAGATGCGCAAGAGTGCAATGCCACGGGATGTCCGCTCTGACGCGTGC
 GCACGTGTGGATGCGGCTGCCACGCTGCGCGCTGTGGGCGACGTGCTGCGGACCGCTTCGACGGCGCTCCCGCGCTCTTTAC
 20 GCAACCCGAGGCGAACCGCGCTCGCGGGCGGAGCTGCTGCGCTGGAGCCCGAAGACCCGCGCACAGGCTCCCTCCCTTCA
 CGACCTCGTCTACTTCGAGAAATCGCCAACTTCTGACGTACAGTGGCGCGCTGGGCGACAGCTGGCAGAGTGGACGAGCTTGA
 ACAGCTGCTCTCCCGCTGGACGGCTGTGAGCTGCTGTGCTGTGGCGGAGGCCACGACGCGCACGCGCGCTCACGGAGCGC
 TGCAACTGCACCTTCCACTGGTGTGCCACGTGAGTGGCGCACTGCACGACACGCGCTTCTGCACGAGTGTCTATGA
- 25 HUMAN SEQUENCE - GENOMIC
 CCTGTGAGTCGGGAGATGACTAAGAGGGAGTCCCTGAGGTCTTTGAAGATGTGTACAACCGAGTCTACATCTGAAAGCCTTAGAA
 ATTCCCCAACCTCGCAGGGAGCTTGGGTGGGTGAGGTGGGAGCAGAGCCTTTGTGGTCTGTTTTTTGTGTTTTTTTAA
 TTCACTTCCAGGTTAATCAGTCTTTAAACCACTTACCTACCACTTCTAGCAGCCCAAGGACTGGAGCTTGGAGCTGGCCCT
 30 TCCGCTTCCCAAGATGTAGTTTATATTGCCCCCTCAAGACTGCCCTTTTATGTTTATCCTAAGCTGCTATTACCTATAAACA
 CTGAGAGGAGGAGAGAGGTGGGGAGTGATTTTCCCTAAGGCCCTCTTAAAGGTGGCTTCTTGTATTGTTTGGGGGTACAG
 AAGCTCAGGCTGCCAAGCCTTCCAGACTTAAATAAATATGCTCACCATTGGGTGTCGAAGCCTCCCTACACAGGCCCTGT
 GGGGAAGGAGGGGACCTCACTTCTTTAGGCGGGGCTCTCCGAGCCCTGAGAAGACGAGAGACAGCAGCCGCTTAGAGACC
 AGGCTCTGCTACCCAGGATCTAGGGCTCTGGGCGAGCCTTCTGATCCCCCTAACTCCAACCTCCAGGGGTGAAGCTGTTTGC
 ACAAGTCTTGGGAATCCCTGCGAGATGGCAGTGGCTATTAAACCCATAGTCCCGAGAGCACTCCCCCTCTCTGGGCTGAGCC
 35 CCCATGGGTCTTTACACTCAGGGAGTGAATCCAGTGGGAAACAGGAGAGGCAGCATGCTCCAGACGAGGCGCAGCATGAC
 CTGTTCTCTGCTCTCCAGCGTCTTCACTGCTCAGGTGAGCAACACTGGAGCCCCACAGCACAGAGAGGGGACTGGCTCC
 CCAGCTTCAAAGTCTCAGGGTCTTGTCTCCAGCTTTGGCTCTGGGAACCCAGCAATAGGGGAGCAGATTTAAACCTTAAAC
 GGTGGGGCGTCACCCACCCCGCTGAGACACTGGGACACAGCCTGGGCTGTCCAGCCAAGATGGGGGAGAGAAAATGGT
 GAGGGGAATAGGGGGCGTTTGAAGCTTCCAGGACTGGGGGCTCTCTGTTTACAGGTGCAACCCAGATTAGCTGAGGCGGAGGC
 40 AGGAAAGGGGGGCTTAGGGTAGGAGAGCAGGACCCAGTGTGCTCGCTGCGCAGCACAGGTGGAAGTTAGGCGCGCAGGGGGCC
 AGACGAGTGGCCAGACCTGGCTCAGAGCGGCTCCGGGGGGGGCGGGGAATTCAGGAGAGGCCCTCCCGAGCGCGAAACCATC
 CTTTCCCGCTCCGCGCGCTCGCCCTGCCGCCACCCCTAGCCTCCGCGGACGCGCGACCCGCGCAGCTCACCGCGCT
 TGAGGATGGCGCTGTGTTGCGGACGGCGCGCGCCCTCAAGCGCGGAGCAGTTCAGCGCTGGTGGCGAGCTGGTGTGACAC
 TCGTGAGCCGCGATGTGACAGCTTGAAGCGCGGACGCGCTCAGCTCGGGGTGGCGAGGACAGGCTAGCTGCGCTGTGCTGAC
 45 GCGGACAGCTGCAAGCACACGCTGTGGCGCTCAGCGCGGCTCGCCAGGCAACTCAGGCGCAGAATCTATTGCTTAGAGCCC
 TGGGAACCAAGAAGCGCTCTGGGCTGCGGTCCAGACCCCTCAACTCTCCCCACCCGGGTGGGTGTTCTATGGCTGGGAGA
 CAAGGGGAATGCTCAGGACTGCACAACCGCAGGAACAGGAGACCCGCGAGGCCGAGGGCGGAGGCGCGGCGGGCTCTCTCC
 AGCATGCTGAAGCCCGAGGCTCCGGTGGGAGATGATCAGAGCTGCGGGACGGGAGACTTGATGCGGGTCAAGGAATGAGGCG
 GCTCGCTTGGGAACCAAGTACGCTTCTTCTCGGCTCTTAACCCACCGGTGCCACCTACTGACCTTCTCATTCTCTCTCAA
 50 CAAAACAGAAAGAACACCCCTTGATTCCAGAGTCCCTGAGGCTTGGAGGTCTTAAAGAAAGAGTCAAGGCGTGTCTCCAGCT
 CAGGACTCAAGCGAGCACCCTGGAACCTTGCCCAATCAGACCAACGCGCGCACACAGACACACTCACTTCCAACTCAGAC
 ACACAGACTCAAAACACTTGTCTCACAACTCGCTACTGCTCTTTCCAGGGCCCCAGACTAGCTTCCCCGCTTACAGAGG
 GCTAGGGAGAGGGATAGGGAGGAGTTCCCCACCACTAAGGGGGTGTCACTCCAGGTGTATCAAGGGCAAGTAGGCTCCATGA
 GAAAGGTCTAAGAAATGAGTTCCTCACTGCCCCCTCTCTGAGCAGCAAGGAAGAGGAGAGGCTCCAGGTGCGAGAAAGAT
 55 GGGGAGGAGGCTGGCTCCCTCTAAAGGGAGCGTGGCAGAGCTGATGCTCTTCCCTATCCCCACCTTGCTTAACACAG
 CTCCCCCTCTCATAGTGGCGCTGTGCTCTCACCCCTTGGCTCTCACTTCTGATTCTAAATCTGGGGGCACTCTTTATT
 CTCTGTCTTTATCTCTAGCAATATCTCTGGCTCTCTATGCGTCTCTGTGCTTCTGTGGGTGGATGCGTGTCTGTCTGTCT
 GACTACACAGTGTCTCTCTCTCTGTGTGACGCTCCCTGCCCTCCCTGCTTCCAGGTCTAATTACCTCCAGTGGTGTGGGT
 GCGGGTCCGAGACAGGACGCTGGGTGCTGGCTTCACTAGTGTCTTAAACGTTGGGAGACTGCGCTGGGTCTGTCTCC
 60 TTTGTGAGAGCGCATTTCTCCAGGGCGGGCACTCTCTTCAACGCTTCCCGAGCGCGCGCGCGCGCGGGAGGAAGGGCGG
 GAGGAAGGGAGGGAGTGATCGAGAGAGCTAGCAAGCCGCGAGCAAGGACTGGGGCTCTGGCTTGTCTTCAACGAGCTCAGGG
 TGGCTCTGCGGGCTGACGGAGCTGCAGCCCCCTCCCGAGCCTGGGGCTTCCCCACCTACCCTCCACTCCAGCCTTGACAGGC
 GAATGCAGCTCCCCCTCTCCAGCGCGCGCGCGCGCGCGCACACACACACACACACACACTCTCTCTCTC
 65 TCACACACCTCTCCCCGACGCTGGGTTTCAAGCTTGGCCCCACTGAAGAAGGAGGTGGCCAGAGTTCCTCACTGATCTGGG
 GTCGCCAAGGCTGCGAGGAGGGTGTAGTAACCTTCTAGGGAGCCAGAATGGGGCCAGATGGCCACATCTTTCATCACTCTCTT
 TGGCTCAGTTTCTCCACCAAGATCAGGGTGGCTGGAAGGTGCTTTGACAAGATGAGGATGGAGCCAGACAGTCTTTGGGCTCTC
 GGTGTGGGACAGTCAATGTGGCACCCACAGCTGAGCGCACCCGGGTACTCAGAGCGGGCAGGAGAAGCACAGTCTGGGCGAG
 70 TGTGTTCCACCTCTCCAAAGCCTGCGCCCTTTGGAGGGGACAGCTTTGGCTCAGAGTTTGGCCCTAGCAGAGGTTCA
 AGTAGCACCAAGATGTGAGCTGCCCGATGCTTCTTGTCTGGCAGGAGTGTGTCACAGAGGATCTTACCTTCTCGGG
 ATTTCCCCGCTGTCACTTTGGGTGGCTGGATTCTGTCTCAAGCTGTAGACTTGTCTTATGGGATGAGGAGGGCCTTGGGAT
 CCAAAATTGAGCCGAGCCCAAGGGCAGCGGAAAGAGCTGTGCTTGGGGTGACAGGCAAGGCAAAACCGCTTAGAGGAGCCC
 AGTGGCAGGCAACGGGTAGGCGCCACCGTGTCTCCGCTGACTCACCTCGAAGCTTAACCACTGTGGGCTATTTTGCAGAG
 AGGGGCCCCAGGCTTTCCAGCGCCCCCGCCCTGCCAGACCGCAGCCCAAGGACAGGCTGGCCCCACGCGCCCCAGGCAATTG
 75 ACTCAGACTGCCCCCAAGCAAGCAGGGAACAGGGATGATACCCACAACCAAGTCACTCTTCTTGGTGGTGGCTGCGCTC
 TGCTGGGCGAGCCAGCTCCAGTCTGTGCTGTGAGGTTCTGCCGCTGCTCAGGGGTCACTGTTGGATAGCGGGCACAGCAGTCT

385

386

GCTTCTAGAGGCTACCATATTTTCCCCCTTTTCAAGGTGAAGGAACCACTGCCACTCCATTTTCCCTGAACATTGCTCATCTC
 TTCAGATATGTGGTCCCTACCTCCTGGGCCCTGGCTGGAGGCTCGGAATGAAAGGGCCCAAAGTACTCTGTGTGATGACACAGC
 CCGCTGCTACTTCTCTTCTTACATGCAATTGCTCTCAGCAAAACAGAAGTTCATTTCATTCAACAAGCATTAACTGAAAGCC
 AGCTGAATGCCAGACCTGTGCACAGGCCCACTGTGTGCACAGTGTGTGCACACAGGTGCAAGCACACAGCTGCCCTCTACT
 CCATGTGCTACATCACCTCCAGCCCCCTAAGGACTTCTGTGCTTCAACCTGCCAGCCTCATCAGGAAAGCAAAGCTTCAAGCT
 CCTGGTGTGCTCAGAGTAGGTTAGGGGGCTAGGGGTAGGGGTGGCTGAGAACAGGACCCCAAACACTTCTGCTTCCACTACTT
 CCCCTGTAAATGAGGGGCTCTTCTCTCTCTCTCCCTGCCCAATCATCTCCCTAAGTAGGTGCCATGTGACGAAGAAAGAGCCATT
 TTGGGATGTGAGGGTACCTGTCCAGGCCACAGAGCTCCCACTCCAGCACTTGCCAACTAGGTGCCAAGCTGGGGCAAGAG
 GGGGCACTTCCACCTGTGAAGCTCCAGCTCTCTCCCCCAGGGCTGAACCCCTCCCTTTTCCCTCTCCCTTATTAATCTCGGA
 AGTTAAGGGCGCTCCCTGGCGGCCCTCAGCCCTATCGTGCCCTCACCCTCTCGGCTGGCGTCTAATTAACCTCTCTGCC
 CTGGTTTGTATGCCCCCTTACCCACCTGTGCGGCCCGCCCTCTGCTCGGCCAGCTCCCCCCACGGACATTCCAGCCAGGC
 CGGGCAGTGTGCCAGGGCAACCAGGGCCGAGCCGAGGCTTAATCTCTCCCGCCCTGGCCGGCTGGGGAGCCCACTCACTCT
 CCCACTCTCTGGGGCTGCCCGCTCTGCTGTGGCGGAGACACAATCGGACAAAGGCACAGCCCCAGGGGGTAACTCAGCC
 TTCAGCCCCAGGTTGTGCGCATTTGGGGAGTTAATGAATTGTCCATCAGCCCTTTCAGGGCCCCCGCTCAGCTGGATTATC
 TTCCGAGCCCTGGTGGGTAGGAGACCTAAGCTGTATTATTAATCTCTCCATGTCTACTAATTAGGTAATTATCTGTGACTCT
 GGCCTGGCAACATGAGGCACTTCTCTGGGACCTCGATGGGCTGGCTCCCACTCTCAGCACCAGCCCTCCCTCCCTCTCT
 TCCAAACCCGCCAAGGACTACGATGGGCTGGAGCATGTGGGAAAGTGACAGCGTCCCAATGTCTCCTCCCAAGCCGCG
 TCTCCATAGCCATCACTACAGAGCTGTCTCTGGTCCCCCAGAGAAGGTGAGAAAGAAGGCAGCCTCTGCCAGGGATGGATT
 TGGCTGGCAGAGCCCTCAGGCCAGAGAGGACCTGTTTCTGAGGACTTGGTTTCTGGACTCTCCAACCTCTCATCTCCAGTGC
 ATGACACAGGGTCTCAAGGTGCTTTTGAGATCCATCTCATGTCCCTATAGCCTTAGGGTGTAAAGAGGCTTAGGCTGTA
 CCAGGCTACTCTGGGAGGTCCTTAACTTACAGTGTGGCAGAGTGGCTGTGGATGTGATGGAGATGTTAAGAGAGACAGCA
 GGAAGGTTCTGTGAGGGAGAGCAAAAGGAGCCAGTCAAGAGGAGCAGTCAAGAGTCAAGCATTCCCGGGGTCACTAA
 TGTGGCCATGCAGCAACTTCAAGGAGAACTTGGATTGGAGGGCAAGAGTTCCAAAGAGCGGATTTACGCTGGAGACAGCTT
 TGGGTCAAGGTGGTGGCCCTGGGGAGCAGGTATGTGTGTACAAGAAAGACAGAGAGAGAGAGAGAGAGAGAGATGAAGAA
 GAAATTTAGGCAGAACTAGATTGTGAATCTTGGAGGCAAGAACTATGTCTTGTGTCTTGGTCACTGTGCTTTTATGAGAGC
 TTAACATTGTACTTGCAGCTAATAGCCAGCTCAAGTGAATGGATGAATACAGATGAAGCCGGCACTGTCTTTAACTGGGATC
 TGTGAGCTATTCTTCCACAGCTGCACTCAGGCTCTCTCTCTCAGGACTTGTGGAAGGAGATGTCTAGACCATCTCTGGAC
 GGTCAAGGCTGGGCACTTCAACAGCTGTGTGACAGCAGACCTTGGCCGAAGTCAAGAGCGGTAGTGGGATACGCCCACTTGTG
 TGACTCTTGGAGAGCTCTGGAGAGACGCTAGCAGAAGGCGAGGTCATCTCAGGAGCAGGATATCACCCGGGCTGCGACC
 ATCCTTCTCTGTATGTCTGAATGCTTGTATGCGAGCGTCTGTGGCAGCTTTTATCATTTGTCTCTTTATTCCAGC
 ATTTCTGAGAGCTGCTCCAGGCCAACTTGTGGGTATACAGAGCTAAATCAGCTAAATCACCTCAGCAGCTCATGTTCCAGC
 AGGGGATTTCCAAAGGTAACAAGACCAAGAGGTTACGATCAAGCCGAGGAAAAAATTTATCCAGGTGTTGAGGAGCAGTA
 ACATTTCCAGCTCAAAAACCTCATCTTCACTCTCTCTCAATCTCTCAGGAGGTGCAAAATGGTTATCTTCTATTACCAAGAA
 ACAGTCTGGGATGTGGCTCAGAGCTGTAACTCAGCACTTGGGAGGCGAGGCGGGCGGATCACTTGAGATCAGGAGTTCAG
 ACCAGCTGGCAACATGGTGAACCCGCTCTCTACTAAAAATACAAATAAAAAATTAGCCAGAGTATGGGCGCCACCTGTAATC
 CCAGCTACTCTGGAGGCTGAGGCAGGAGAACTCGTTGAACCTCAGGAACCTGGAGCAGAGATCACACCACTGCATCTAGCTTGGGTG
 ACAGAGTGAGACTCCATATCAAAAAAAGAAAAAAGCAAAAAAGCAAAAAAGCAAAAAAATCTTCAAGTCTTGCTCCC
 ACACATCTTTCCAGGACTCACTCTCTGCCCCACTGCATTCCCTAATGCTCTGCTCCCTGTGAAGCCAGGTGTTTCTACCTC
 TCTGATTTTCCCACTCTCTGCATTTTCCCACTCTAGAATCTGCCCTTCCCTGTATCCCACTGTTGGAAACCACTCAGATG
 TTCTCTCTCATGAAGACTCTTCTGATTTCCTTGGTAGAGTGGTCTTGCTGTTCTAGCTCTGAAGCACCATGTAGGTAGGTG
 CTTTCTATTAGCAGCATACTGGGTGTCCATTTGGTGGTGTCTGTGTATATTACTCATCTCTCTACTAGGCTAGCCCTTGCAGCA
 CTGACCTGGGCATATCATATGCTTTGTTAAATGGTGAATAGCGGATACATGAATAAATGGATGCAGGACAGAGGATGAATTCG
 ATGGAAGTATAAATGGGCGCAGGCGCGGTGGCTCATGCTGTAAATCCAGCACTTGGGAGGCCAAGGCAGGCGGATCTCTGAGG
 TCAGAGTGTGAGACAGCCTGGCCAACTGGTGAACCTGTCTCTACTAAAAATACAAAAATTAGCCAGGATGTGTGTGGGCG
 CCTGTAATCCCACTCAAGAGGCTGAGGCATGAGAATCGCTGAACCTGGAGGCGAGGCTGCACTGAGCAGGATCTCACT
 AATGCACTCCAGCCTGAGTGACAGAGTGAGACTCTGTCTTAAAGAAGAAAAAAGTATAAATGGCCAGATAGATGACAAATAGGTT
 GGTGGATGGGTGATAAGTGGATGTGGAATGTATAGATGGATGGGTGGGTGGATGGATGAATAGATGGATGAATGGAATCTATC
 CATAAAGGACTCAAAAAGGCTATGTAGGCTGAGTGCAGTGTCTTATACCGTAATCCCAACATTGGGGAGCCAGGATGGAG
 AATCGTTTGGAGCCAGGATTTGAGATCAGCTTGGGCAACATAGGAGACCCGCTTCCACCAAAAAAAGAAAAAATTA
 GCCCGCATGGTGACACGTGCTGTGGTCTCTACTATTAGGAGGCTGAGGTGGAAGGATCACTTTGTCTGGGGAGGCTGAGGCTG
 CAGTAAGTTGTAATCGTGCCACTGCACTCCAGCCTGGGTGACATAGCAAGACCTGTCTCAGAAAAAGAAAAAAGAAAAAATGG
 CCAGATGTGGTGGCCATGCTGTAATCCAGCACTTGGAGGAGTGGAGGAGCAGGAGATAGTGTGAGGTGAGGATCGAGACAC
 CCTGGCCAACTGTTGAACCTGTCTCTACTAAAAATACAAAAATTAGTGGGCGTGGTGGTGGCGGCTGTAACTCCATCCACT
 TGGGAGGCTGAGGCAGAAAGATTGTTGAACCCGGAGGTTGAGGTTGAGTGAGCTGAGATCGCACCCTGCACTCCAGCCTGGG
 TGGCAGGAAAGAAAAAAGAAATTTAAAAAAGCCAGGTAGCAGCAGAGGCTTCAAGGGAGGGAGCACACCCCATGCTAGGATATGC
 AGAGGCAGAGGCAGTATCCAGGCCAACTTCTCTTCACTAACATCTGCACCCTCAGCACTTGTCTCCAGAGGCCCTAGATACATT
 CCATCTCCCATAGAAGTCAATGCTGGGAGTGTCTCTTTTATCTCTCTCTGGTCCCTCAGGAATGCTTTTCAATACATATAT
 TATGCCATCTCTGCACTGCAATGACTGTGGTCTCTCTCTTCCATCTCTTCCCTATATCATACACACCTAGCTTGAAGCT
 CCCTGAAGGGAGGAAGCATGCTGAGTCTCTTTGTGTCTCTAGCCTGGCATATATGTTTAAATGAGTGAGTAAACAAATGAACA
 ACTGAGTGAGTGTCTCTCTCTCCATAGACACATTTTATACACTCTCTGCGTCTCTTGTTCAGTTATCTCTCTCTGGCCCTCTCC
 TCCTTACACACATCACTCACTCCTGACCTTGACACTCTGAAATTCAGAGTTATATGCTGGGGCTCGGTTTCTTACCTATT
 TGTGGCTGATCTAGGGAAGTCCAGCCCTCCCTGAGAGTCTGAAAGAGAGCGGCTCTTGACTCTCTAAGCCATATTAACCTGGGT
 CCCATGGAGGGCAGAAAGGGGCTTCCCTAGGAAGAGCTCTCTATGGGAGGGTAGCAGGATCCTGCACTAACCTGAGGCTGTGCTG
 CCCCATAATTGACCACATCTCTGTGTCTGTCTCTCTACTCTGACCACTGAGGCTGTCCCAAGGTAGGGGTGGTGTGGCCCTC
 TGTCTCAAGGCTGGCTGGCAGACACAGCCAGATTAGAAGTCAATTTTCGACAGGGGAGCCCTCAGTGTGCCACCCACAGAGCCCT
 GGAAGGTGAGTCTGAGATATGGCTCACCAGGGGCTGGCCCTAGACCTGAGAGTCACTCTCCCTCTCTGTCTCTCTCTTTT
 GCCCAGAATTTGGCAGCTGGTGTGACTCTATCTTAGGCAAGATGAGTAAGTTCTGGGGGAAGGGGTGTGTGCACTGACAC
 TCTAACCCGCCAAGCACTGCCAGGGCAC

70 HUMAN SEQUENCE - mRNA
 ATGGGGCTCTGGGCGCTGTGTGCTGGGTTTCTGCTACGCTGCTGCTGGCGCTGGCCGCTCTGCCCGCAGCCCTGGGTGCCAA
 CAGCAGTGGCCGATGGTGGGTATTGTGAACGTAGCCTCTCCAGAACCTGCTTACAGACTCCAAGAGTCTGCAACTGGTACTCG
 AGCCAGTCTGAGCTGTGAGCCGCAACAGCGGCTGATACGCCAAATCCGGGATCTGTGACAGGCTGAGTGGGGGCTG
 CAGAGTCCGTCGCGAGTGCAGTGGCAGTTCGGAAATCGCGCTGGAATCTCCCACTGCTCTCAGGCGCCCACTCTCCGCGCA
 GATGCTCAACCGAGGCTGTGAGAAACGGGTTTATCTTCGCTATCACTCCGCGGGGTCAACCATCGGTGGCGCTCTGCT

5 CAGAAGGTTCCATCGAATCCTGCACGTGTGACTACCGGCGGCGCGGCCCGGGGGCCCGACTGGCACTGGGGGGGCTGCAGCGAC
AACATTGACTTCGGCCGCTCTTCGGCCGGGAGTTCGTGGACTCCGGGGAGAAGGGGCGGGACCTGCGCTTCCTCATGAACCTTCA
CAACAACGAGGCGAGGCCGTACGACCGTATTCTCCGAGATGCGCCAGGAGTGCAAGTGCCACGGGATGTCCGGCTCATGCACGGTGC
GCACGTGCTGGATGCGGCTGCCACGCTGCGCGCCGTGGGCGATGTGCTGCGCGACCGCTTCGACGGCGCCTCGCGCGTCTGTAC
GGCAACCGCGGCGAGCAACCGCGCTTCGCGAGCGGAGCTGCTGCGCCTGGAGCCGGAAGACCCGGCCCAAAACCGCCCTCCCCCA
CGACCTCGTCTACTTCGAGAAATCGCCAACTTCTGCACGTACAGCGGACGCTGGGCACAGCAGGCACGGCAGGGCGCGCTGTA
ACAGCTCGTCGCGCGCTGGACGGCTGCGAGCTGCTCTGCTGCGGCAGGGGCCACCGCACGCGCACGCGAGCGCTACCGAGCGC
TGCAACTGCACCTTCCACTGGTGTGCCACGTGAGTGCAGTGCAGCAACTGCACGCACACGCGCTACTGCACGAGTGTCTGTGA

10 HUMAN SEQUENCE - CODING
ATGGGGCTCTGGGCGCTGTGCTGGCTGGGTTTCTGCTACGCTGCTGCTGGCGCTGGCCGCTCTGCCCGCAGCCCTGGCTGCCAA
CAGCAGTGGCCGATGGTGGGTATTGTGAACGTAGCCTCCTCCACGAACCTGCTTACAGACTCCAAGAGTCTGCAACTGGTACTCG
AGCCAGTCTGCAGCTGTTGAGCCGCAAACAGCGCGCCTGATACGCCAAAATCGGGGATCCTGCACAGCGTGAGTGGGGGGCTG
CAGAGTGCCTGCGGAGTGCAAGTGGCAGTTCGGAATCGCCGCTGGAAGTGTCCACTGCTCCAGGGCCCCACTCTTCGGCAA
15 GATCGTCAACCGAGGCTGTGAGAAACGGCGTTTATCTTCGCTATCACCTCCGCGGGGTCAACCATTCGGTGGCGGCTCCTGCT
CAGAAGGTTCCATCGAATCCTGCACGTGTGACTACCGGCGGCGCGGCCCGGGGGCCCGACTGGCACTGGGGGGGCTGCAGCGAC
AACATTGACTTCGGCCGCTCTTCGGCCGGGAGTTCGTGGACTCCGGGGAGAAGGGGCGGGACCTGCGCTTCCTCATGAACCTTCA
CAACAACGAGGCGAGGCCGTACGACCGTATTCTCCGAGATGCGCCAGGAGTGCAAGTGCCACGGGATGTCCGGCTCATGCACGGTGC
GCACGTGCTGGATGCGGCTGCCACGCTGCGCGCCGTGGGCGATGTGCTGCGCGACCGCTTCGACGGCGCCTCGCGCTCCTGTAC
20 GGCAACCGCGGCGAGCAACCGCGCTTCGCGAGCGGAGCTGCTGCGCCTGGAGCCGGAAGACCCGGCCCAAAACCGCCCTCCCCCA
CGACCTCGTCTACTTCGAGAAATCGCCAACTTCTGCACGTACAGCGGACGCTGGGCACAGCAGGCACGGCAGGGCGCGCTGTA
ACAGCTCGTCGCGCGCTGGACGGCTGCGAGCTGCTGCTGCGGCAGGGGCCACCGCACGCGCACGCGAGCGCTACCGAGCGC
TGCAACTGCACCTTCCACTGGTGTGCCACGTGAGTGCAGTGCAGCAACTGCACGCACACGCGCTACTGCACGAGTGTCTGTGA

25

MOUSE NOMENCLATURE
ICSGNM Rasgrp1
Celera mCG14557

HUMAN NOMENCLATURE
HGNC **RASGRP1**
Celera **hCG38304**

[illegible]

390

[illegible]

GGATCCGCGGCCATGGGAACCTTGGGCAAGGCGAGAGAGGCTCCGCGGAAACCTTGCCATGGCTCCAGAGCTGGCCCCAAAGCAAG
 ACTAGAGGCCAAATCAACCAACAGCCCTCTCCCTGCCAGCCAGCTTGCCCCAGATCACCCAGTTCCGAATGATGGTGTCCCTGG
 GACATTTGGCCAAAGGAGCCAGCCTGGATGATCTTATTGACAGCTGCATTCAATCTTTGATGCGGATGGAAACCTGTGTCCGAAT
 AACCAACTGTTACAAGTCATGCTAACCATGCACCGGATCATCTCTCAGCCGAGCTGCTACAAAAGTCATGAATCTATATAA
 5 GGATGCCCTGGAAAAGAAATTTCTCAGGAGTTTGCCTGAAGATCTGCTATTTTGTGAGGTATTGGATAACAGAAATCTGGATCATGT
 TCAAGATGGATGCCAGCTTGACCAGCACCATTGAAGAGTTTCAAGACCTGGTGAAAGCCAATGGTGAGGAGACCCACTGCCACCTC
 ATCGACACGACCCAAATTAATTTCTGAGACTGGTCCAGGAACTGACTCAGAGGATAAAATCGAATACTAGCAAGAAGCGCAAAGT
 GTCCCTGCTGTTTGACCATTGGAACCTGAAGAACTGTCTGAACACCTCACCTACCTTGAGTTCAAGTCTTCCGACGGATATCTT
 TCTCTGATTACCAAAATTAACCTTGTAATAGCTGCGTAAAGAGAACCCACCATTGGAGAGGTCCATTGCCCTGTGCAATGGCATC
 10 TCCAGTGGGTACAACCTGATGGTTCTCAGCGCTCCACCCCGAGCTCCGGGCGAGGTTCTCATCAAGTTTATCCATGTGGCTCA
 GAACTCCACCAGCTACAGAACTTCAACACGCTGATGGCTGTGATCGGGGAGTGTGTACAGCTCCATCTCCAGGCTTAAGGAAA
 CAAGTTCACATGTCCACATGAGATCAATAAGGTTCTGGGCGAGATGACTGAACCTGCTGTCTCTCGAGAACTATGACAACTAC
 AGGCGAGCCTATGGGAGTGACCCACTTCAAAATCCCATACTGGGTGTGACCTCAAGGACCTCATATCCTGTATGAGGCTAT
 CCTCGACTATCTGGAAGATGGGAAGGTGAATGTCCAAAAGCTCCTGGCCCTTTACAATCATATCAATGAATTGGTCCAGCTGCAGG
 15 AGATGGCCCCACCATTGGATGCCAACAAGGACTTGGTGATCTGCTGACGTTATCCCTGGATCTATACTATACAGAAAGTGAATC
 TATGAGCTTTCTATGCCCGGAGCCGAGGAACACAGAGCTCCGCCACTGACACCTTCGAAGCCACCAGTTGTAGTAGACTGGGC
 CTCTGGAGTGTCTCCCAACCTGACCCAAAGACCATCAGCAACACGCTCCAAAGGATGGTGGATTCTGTCTTAAAGAACTATGATC
 TCGACACGAGTGGCTATATCTCTCAGGAGGAGTTTGAGAAGATCGCTGCAAGCTTTCATTTCCTTCTGTGTGATGGACAAAGAT
 AGGGAAGGCCCTCATCAGCAGAGACGAGATCAGGCGCTACTTCATGAGGGCCAGCTCCATCTATTCCAAGTGGGCTGGGCTTTCC
 20 ACACAACCTTCAAGAAACCACTTACCTGAAGCCCACTTCTGTGACAACTGTGTGCTTCTCTGGGCGGTGATCAAGCAAGGCT
 ATCGCTGTAAAGACTGCGGGATGAACCTGCCAACAACAGTGCAAAGACCTGGTGGTGTTCGAGTGCAGAAAGCAATCAAGAGCCCA
 GCAATATCCACAGAGAATCATGCTCTGTGTGACCAATGTCCACCCTTTGTCCACTGGGAACCAAGATCTGCTCCATGCACCCGA
 AGAAGGATCTTTCATTTCCTCAAAAACGGAGAGATTGTGGACCAAGTGAAGGAGAGCAAGGATAGGACCATCATGCTCCTCGGAGTGT
 CCTCCAGAAAATTTCAAGTTCGGCTGAAGAGGACTGTGTGCCACAAGAGCACCACCAAGCAATCGTTCCTGGTGGTGTGGCGAG
 25 ACCAGCCCTGTGCTTGTGCTGTCTTCCAAGGAAGTCCGCGCAGGGCGCTCTTATGTGACAGTCCAGCATCTCCATGCC
 CAGCCAGCATGCTCTCCAAACCTGACCCAAAGACCATCAGCAACACGCTCCAAAGGATGGTGGATTCTGTCTTAAAGAACTATGATC
 GGCTCCGGACCTACCAAGAACTGGAACAGGAAATAAATACCCTGAAAGCAGATAACGATGCTCTGAAGATCCAAGTGAAGTACGCA
 CAGAAGAAAATAGAAATCCCTGCAGCTTGGGAAAAGCAATCATGTCTTAGCCAGATGGACACCGGTGATAGTGCTTAATCCAGAAT
 30 TTCAAGGACCAGAATCTGCAGACGGGTTTACTGGGATGTCGAC

MOUSE SEQUENCE - CODING

GGATCCGCGGCCATGGGAACCTTGGGCAAGGCGAGAGAGGCTCCGCGGAAACCTTGCCATGGCTCCAGAGCTGGCCCCAAAGCAAG
 ACTAGAGGCCAAATCAACCAACAGCCCTCTCCCTGCCAGCCAGCTTGCCCCAGATCACCCAGTTCCGAATGATGGTGTCCCTGG
 GACATTTGGCCAAAGGAGCCAGCCTGGATGATCTTATTGACAGCTGCATTCAATCTTTGATGCGGATGGAAACCTGTGTCCGAAT
 35 AACCAACTGTTACAAGTCATGCTAACCATGCACCGGATCATCTCTCAGCCGAGCTGCTACAAAAGTCATGAATCTATATAA
 GGATGCCCTGGAAAAGAAATTTCTCAGGAGTTTGCCTGAAGATCTGCTATTTTGTGAGGTATTGGATAACAGAAATCTGGATCATGT
 TCAAGATGGATGCCAGCTTGACCAGCACCATTGAAGAGTTTCAAGACCTGGTGAAAGCCAATGGTGAGGAGACCCACTGCCACCTC
 ATCGACACGACCCAAATTAATTTCTGAGACTGGTCCAGGAACTGACTCAGAGGATAAAATCGAATACTAGCAAGAAGCGCAAAGT
 GTCCCTGCTGTTGACCATCTGGAACCTGAAGAACTGTCTGAACACCTCACCTACCTTGAGTTCAAGTCTTCCGACGGATATCTT
 40 TCTCTGATTACCAAAATTAACCTTGTAATAGCTGCGTAAAGAGAACCCACCATTGGAGAGGTCCATTGCCCTGTGCAATGGCATC
 TCCAGTGGGTACAACCTGATGGTTCTCAGCGCTCCACCCCGAGCTCCGGGCGAGGTTCTCATCAAGTTTATCCATGTGGCTCA
 GAACTCCACAGCTACAGAACTTCAACACGCTGATGGCTGTGATCGGGGAGTGTGTACAGCTCCATCTCAGGCTTAAGGAAA
 CAAGTTCACATGTCCACATGAGATCAATAAGGTTCTGGGCGAGATGACTGAACCTGCTGTCTCTCGAGAACTATGACAACCTAC
 AGGCGAGCCTATGGGAGTGACCCACTTCAAAATCCCATACTGGGTGTGACCTCAAGGACCTCATATCCTGTATGAGGCTAT
 45 GCCCGACTATCTGGAAGATGGGAAGGTGAATGTCCAAAAGCTCCTGGCCCTTACAATCATATCAATGAATTGCTCCAGCTGCAGG
 AGATGGCCCCACCATTGGATGCCAACAAGGACTTGGTGATCTGCTGACGTTATCCCTGGATCTATACTATACAGAAAGTGAATC
 TATGAGCTTTCTATGCCCGGAGCCGAGGAACACAGAGCTCCGCCACTGACACCTTCGAAGCCACCAGTTGTAGTAGACTGGGC
 CTCTGGAGTGTCTCCAAACCTGACCCAAAGACCATCAGCAACACGCTCCAAAGGATGGTGGATTCTGTCTTAAAGAACTATGATC
 TCGACCAAGGATGGCTATATCTCTCAGGAGGAGTTTGAGAAGATCTGCTGCAAGCTTTCATTTCCTTCTGTGTGATGGACAAAGAT
 50 AGGGAAGGCCCTCATCAGCAGAGACGAGATCAGGCGCTACTTCATGAGGGCCAGCTCCATCTATTCCAAGCTGGGCTGGGCTTTCC
 ACACAACCTTCAAGAAACCACTTACCTGAAGCCCACTTCTGTGACAACTGTGTGCTTCTCTGGGCGGTGATCAAGCAAGGCT
 ATCGCTGTAAAGACTGCGGGATGAACCTGCCAACAAGTGCACAAAGACCTGGTGGTGTTCGAGTGCAGAAAGCAAGTCAAGAGCCCA
 GCAATATCCACAGAGAATCATGCTCTGTGTTACCAATGTCCACCCTTTGTCCACTGGGAACCAAGATCTGCTCCATGCACCCGA
 AGAAGGATCTTTTCATTTTCAAAAACGGAGAGATTGTGGACCAAGTGAAGGAGAGCAAGGATAGGACCATCATGCTCCTCGGAGTGT
 55 TCTCCAGAAAATTTCAAGTTCGGCTGAAGAGGACTGTGCCCCAAGAGCACCCAAACAGAAATCGTTCCTGGGTGGTGGGCGAG
 ACGACCCCTGGTCACTTTGTGCTGTCTTCTCAAGGAAGTCCGCGCAGGGCGCTCTTATGTGCACAGTCCAGCATCTCCATGCC
 CAGCCAGCACTGTGCGAAAGCGGGCATTCTGCAAGTGGGAGAACAAAGAGTCCCTTATAAAACCAAAACAGAACTTCACTCTC
 GGCTCCGAGCTTCAAGAACTGGAACAGGAAATAAATACCCTGAAAGCAGATAACGATGCTCTGAAGATCCAAGTGAAGTACGCA
 60 CAGAAGAAAATAGAAATCCCTGCAGCTTGGGAAAAGCAATCATGTCTTAGCCAGATGGACACCGGTGATAGTGCTTAATCCAGAAT
 TTCAAGGACCAGAATCTGCAGACGGGTTTACTGGGATGTCGAC

HUMAN SEQUENCE - GENOMIC

GGTGCTTGGGAGGGCATGGCTGGAGAGGTAAGATCCAGTCATGCAGGTACATGATGTTAAAAAGTTTGCACTTTATTCTGTAGGCA
 ATTGGAGACTCTAGGCAGTTTAGAAGCAAAAGAAATATGTGACCATGTACATGAAAGAAGCAACATGAAAGAAGAAATCAGAGAAA
 65 AGGAGGTTATGTAATTAGGGACGCCAGTTACAAGCTATTACACATGTCAGGTAAGAGATGATGGGGCTTAGACCAGCATGTGG
 CTTTAAAGATGGAGAGGAAGCCCTTGGGAACAATGAAGGAGGTGGTGGTTGAAAATGTGGGTCTAAATGTCTAGGTGACAAAGGTG
 GATATTCGACAGAGAAGATCATATAGGTCTGCTGAGGCCATGGGAGAAAATAAAAACCACTACTTTGAGTAACGGATCATTAGA
 AAATCTGAAGAAAGCTAACAACCCCTTCCCCAGAAAAAATACACAAAAATTTAGATATAGTTTCAAGAGCTTCAATATAGTAT
 70 AGTCCCTTCTCCCCAGTTAATCTCTCATGGACATTAATTAAGAGTCCATGATTAGAGAGAAGGAAGAAATAACAAAGAAAGCATCCA
 GAGGAAGGGCTCACCAGGGGTGAGAAGAGGAAGACTCCCAACACAGACACCTAGGAAAAATAGAAGAGAGGGTAAATGAGGGT
 ACAAGATAACACACTTGGGTGGCTGGCAAGATGGCCAAATAGGAACAGCTCTGGTCTCAGCTCCAGCGGATCAACACAGAAAGG
 CACATGATTTCCGCATTTCCAAGTGAAGAACTGGCTCATCTATTGGGACTGGTTAGACAGTGGGTGCAGCCACCGAGGGCGAG
 CCAAGAGCAGGGTGGGGCATCACTCACCAGGGAAGTGCAGAGGGGCCAGGGAAACGCCCTCCCTAGCCAAGGGAGCTGTGAGGGATT
 75 TGCCATATGTCACACAGGGCCCTGGGTTTCAAGCACAAAACCTGGGCAGCCATTGGGCAGACACTGAGCTAGCTGAGGAGTTTTTTT

394

GTATTATGCATATATGTATATTTACATATAAATAATGATGCATTTACATAAAGGCATCCATTGGGCATACATACCTATGCATAT
GCAGTATAAGGCTGGATTATTTCCCTGCCACACAAAGATTGTGCTGCCAAGAGCTCAGTGCATGAATGGCATGGGAGGGGCT
CTATTTTCAAGGGTGAAGCAATAGAGAAATACCGAAGCCTCGGATAAAGCTGTAGGGGATCCACAGAAAGCCACCGGGGACAGT
GCCAGTAAGCTTATCACTCCTGCCATAGACAGCGGACTTCAAAGAAAACTGAAACCCCTTCTCCGGAATAATCAGGAAGGATCT
5 TATTTTCTTCTTTGAGGTGAGCAGCATTTTGCTTTTCAAATCAAATCCACAGCAGTTCATTAGTAATGTCCACAGGTAAGTCTC
AAGTTGGCAGCTGTGGAAGCTAAGAAGCATAAGACCTGATTCTTGACCTCGGACAAATTTACAGTTTACGTGTGGAGGTAAAGACAG
GGACACAGAAATATTATGTGGCAATGAAAGTGTAAATATTATAGATTTAAGTAGGGTAAAGAGCTCATTCTGTAGTAGAGGGGTCA
10 GTGAAAGTAATTGTTTACCTGGTAATAAGAGAAGATCTCTGTGAACAAAGTCTAAGACTGCAAACTTAGGACTGTTGGGAGATAG
TCAGATAGATTATATATAGATAAACTTTTACCATCCTCAGACATCCGCCAACTTGGTGTGTTAGGTGTAGGGCTTACATGAG
GAAGGGTGATAATAGATAAATCTTAAAAATGTTTGAGCCTTAGACCCAGTGAGTGAGAAAGAGTGTATCATTTAATATTCTCTG
ACATTCACCTGCCCTTCTGCTATCTGTGGCTGTGACTGAGGACTTGGTCTTTATATACCCAGTGTTTATGAGGATCTCTCGGAG
AAATTTCTTGTCTGGTCTCAGTATCAAGAAAGGGGGATCTTCTTGTAGCAATTTTGTGTTTGGTCTTGCATGTGATAGGAATTGAA
15 CTTTAGACAAGGCTCTCTTTAAACTTGACTGCTAGAAATGACAGGAGACAAATTTTGGTCCACCTGTAGCAAGGATTTTGACTC
TATGAGATGCATTTATTTCAAATGATGTTTATTTTGGCTCCATCTGTGTGCTCATTTTTCAATTCACACACTTCTTTTGTAG
GTTATGTGCTCTTGTAAAGCTATCTCGAATTCGTTTAAAGGACAAGGTAGCATATAAATAAGGAAATATATAAATGAACAGAG
GAAGGCTTTAAAGTCCAGAACACTATGGCCAGGAAGCAACTATGACTGTGGCTAGAGTTATGGTCTGTGGCGGTATAGTGTG
TGTATTAGGGCAGTCCAGCAGTGATTACAGGAGTACAGACAGACCTCAGTCCAAGTCAAGGCTCTCTCTGCTGTTTATTAGTGTG
ATGATCTAAGGCATAGCATTCTCTAAACCTTCAATTTCTCATCTTTACACAGTGATCTCTTGTATCAGGAGAGTGGATTAAT
20 GAGGTAATGTATAGAAGCACTTAGCAACACCGCACTCAATCTAGCTATTGAGATTATCAGCACTATCAGCAAGCAGCGG
GATGGGCGCGCCCTCTTGGCCAGGTCTTCTGTGCGCATGAGCTTGTATGAAAGTGTGCCACATCTCTACACCCACCGCAGCGC
AGGCGGCGCGCTGTGGCCAGATATGGATCAGCCTGTGGAGCGCACCTCCACACAGGCAGCGCTCGTCCAAGGTGAGGGCGCAG
GGCACAGGGCAGATGTCTACGGCCAGTCTGTGAGACGGCTACCTAGAGACCCAGGGCAGAGTTAAGGCACTTCAACAATGTCT
TTTCCGTTCTTTCCCTGCCGAGTCTCGGCTCTGATATATACAGGAGAGGCTTGGAGGGGAGAGGCGCTCTCACTGCACTGTC
25 TCCGAGCAGCGGCGCAGGAAGAGGCGTGGAGCTGCGGGTGGCTGCGGGAAGAGGGGTCCCATGGGAGCGGCTAGCGCAGCCCG
TTTCCGAGCTGAGGTGGAGGTGCGAAACGCACAGGTGCGCTGCAAGGCGGGGCGTGGTAGCGGGAGCCGCTCTCTCAACTC
CCCTGAGACTTAACCTTTTGGCCAGAGAGGTCGAGGCGGGCAGGGGTGAGAGAACCGCAGGCGCAGGCGCGGCGGAGG
AGGGGCGAGGTTTCCGGGAAGAGCGGGCGCGCAGCTTCTGTGACGCCAGCATCAGCGTGTGAGGTGTTGCGAGGCGGGTG
TGAGCGCGCGCGGAGGAGGAGGGGCGCGCTCGCACAAAGTTTGTGCTGCGGTGACCTCGGTGCGGCTCGCGGGCTCGAGGG
30 TGGCGGGCGCGGGCTACGAGGCGCGGGGGGAGAGAGCGGCGGCGCGGCGGTGGTGGCGGGGGCGGCTCGCGGGCTCGAGGG
CGCGCTAGGTGAGCGGCGCGGAGCGGCGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGG
AGTGGGCGCTCGGAGCGCTGTGCTCTTCTTGGGAAAGAGGCGCTGCGCGTGCGCCAACACCCGAGGGAAGTTGAGGGCGGA
GGGGGCGCGGGTCTGCGCGGAGTCCCGGACACAGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGGCGG
35 NNN
NN
NN
NN
40 NNN
NN
NN
NN
45 NNN
NN
NN
NN
50 NNN
NN
NN
NN
55 NNN
NN
NN
NN
60 NNN
NN
NN
NN
65 NNN
NN
NN
NN
70 NNN
NN
NN
NN
75 NNN
NN

396

AAGGAGGAGATGGGAAATCCCCTTCATTTCATATCTGTGCTCTCCTGCTTGGCAGTGTGTTGTTGCAGGCCCGCTGTAGAGAACAGA
 GGCAATGCTTATGCGTAAAGTTAGACAGTGTCTCAGGAATCTGAGCAGTTCATTCAGTAAAGCCATCCAGAGAGATGAGTTTTAC
 TTCTGAGAGAGCTGGAGACAGACAGTAGTTTAACTATTGTGGACTCTGAGGATCTGAGCCTTTACCTAACTTGACCCAAT
 AATCCTCCCAACAACCTTATGAGGTGGTTGTTTGTCTCCTTTAACTAATAGAGAATTGTAGCTCAGGGAAAGTTAAATGACCTG
 5 TGGAAAGTGGTTAGCTCATTAGTGAGAGAGCTGTGAGATGTGAACCTCTGGTCAGTCTTCCCCGAGGTTCCGCTCTTTCTGCT
 ACTCCAGAGATTCTCCAACTTTGGCGTGAGGAATAATCAGGGAGTGTGTGAACATTCAAATTCCTCACAGTCAACCCAGAGATT
 GCCATTGAGCAGCAGTCACTGGTTTGGATGGAGGTGACCCATGAATGGATGTTGAGAAATACTGTGATAGCACACTTCTCTCC
 TGAACATCCCAGATCATTTTTCTCAGACATCTAGGAAAACCTGAAGGGCACAATCTCCAGGGAGCAATAGAGCATATAGGTTT
 TTCAGTATGTGAAGTGAAGAACATGTTGAGGCCAGCTCTTGGAGATCTCTAAACCAATCCAGCCAGATCTAATGAGATCCC
 10 TGCCTAAGAGCAGTCTGAAACCTGGGAGCACTTTTATCAGATTTTCTGCATTCCTATCTCTCTCACTGCAGTAAGCCCCCT
 ATAAATGTACAGCACGCTCTGTGTGGCTGTGTAATAGAAATGTGGATGTCTGTTACAACTACAGTTTGATTCTTGCAATCAAA
 GGCCATATTCCTAGTGATACATTTCCACCTTTATTCAACACTCCAGTTTCTATGGTGTGGGAGGCTACTCCGTAACCTTATGCC
 CGTCCCCATGGGTGAGGACTACAGTAGTGGCTTAGCTGGGAGGAACTGGGGAGTGTCTCTCTGAGTACTTACCCAAAGTAC
 TACTTTGGCAACAGATTATGAAGCAATATGTTGAAGTGAAGTTTATGAATCTGTGATGAAAACATTGGGAACTGTGTGAA
 15 AGCAAAACAGTCTTTTTCAGTAATTGACAGAAACAGCTGTGTTGGACCTGAGACCCCTGGAGAGAGGTCACTACAGTTCCGGGCCC
 CAGCCGAGCCCACTGCTGATGTGTAAGTGTGCTCCTGCGGAAACAATTATAGCTGTGTCTGTTCTGGAGTTACAG
 TGAGCTTTGGCTACCACTAGTTGGCTTCCCTAGAGTGGCTGGAAGGAAAGAACGGGAAAGAGTGAGAAATGAAGCAGGCC
 AGCTTCTGGGCATGCCACCTCTGAAGGCCACAGGTTCCCATGCTTGGTTAATGTGTGACAGTCTTGAAATTTTAAATATTT
 TTGAATAAGGCCATCATTTTTAATGCACTGAGTCCCACCACTATGTAGTCAGAGGTCTGTGAAGGCCACAAGACCAGAGG
 20 GCAAAATAAATTTGCCATATATTGAAGACATAGAACGATGTGGATTATGCTTAATTTCTTTCTCATAGATGCAACTGTGAA
 ACAAAATTTATTTTATTATCTCTAGCAGTGGTGTCTGGGCTGGCTCATACCAGCTCACAGAGCAGATTGTTAAATTTTCAGGA
 ATTTTGAAGCTAGTTATTAACACAGCCATGATTGAAATTAAGTTATATATGCTTACAATTAATTTATTTAAACCAAGATA
 AGAAATCTCAAACTCACCCTTCTAATTCATGACTACATTTTACTAATCTTTGCTTTGAGGTTATCTGTTATGTTCTTAC
 CTGGTACAAACGCTATATAATGGTATGCTAGCATGCATTTTTCCAGCTCCGTTTCAAGTCAAGTCAAGTCAAGTCAAGTCAAG
 25 AGTCTGTGGGAGTATTTACACCGTGAATTAACAAACATCAATCAGGGCTTCTTTTCAATCCCTCCCTGGAGAGCCCAT
 GTTTAACTATTACAGCACACCACTGTTTCCAGATACAGAGGCTGTACATAACAAATGTTGAGGTGAGGAGGCACTAAA
 AGCTGAGACTTCTATTTTTATCTCTTAATTAAGAGAAAGTAATAATCTGCTATTATTTGCTTTTCTATGTATCTTATAAAA
 CAACCTCTCTGTGTCTCTTCAAGGAAAGGAAACATGGACCTTAGAGATAAGGAAATCATGTATCAGTGTGGTTGAGAGTTTTC
 TTAAGAAAGTGACAAATGGAACATGAAACAGCATGAGAGATTCTCAATCTGAAGTCAAGTATTATTCGTGTTTGTATGTTTAAAT
 30 TCACCTCTAAATATCTCTTAAGATTAAACAGCCTCGTTTCTGACCAACCTCAATTTTGTGAATTTTGTCTTCTCATGTATTATA
 TGCTATCTCTATTTGATTCTGATTCCATCTGCTTAATCATTTGCGCTTCAATACCCACTGCATGGTAACAGGCACACTAGGTGTC
 TATAACCAAGCTTTGTTGAGTATGTTTCAAGTGTGTTGCTTCTGCTTCAATACCCACTGCATGGTAACAGGCACACTAGGTGTC
 TGCTATTTATCATCTGCTCAATGCTTTTATTTAGAGGCGTGCAAAAGCTTTTATATAAAAGCTGTAACTCTTTGAAT
 ATCATTTACTATAGGCATTTTTTCTGTTCTCATTTTCAATTTTATGTTGGTTTGTATTTGTATGTATAGAACTTCCGATT
 35 TTTGTGTTAAATTTGCCATTTCTATTTAGCTTTTAAATTTCTAAACCTTAAAAAATCCCTATTCCAAGATTAAATTAATAG
 TCCATTGCTATTTTAACTAGTTTCTTAAACCGATGATAATTTCCATATCATACATGTGCTGGATGATCAAGCTTGTGCA
 ATAAGTATTGCTGGCAAAAGAGCCTTCAGTTTGTGTTCTGAGATTGTCAATTCCTTAAACACAGCGCTTGGACTGGTCCG
 TTTGTAATCAGAGCCTCCGTTTCTGCTGTGATACCAATTAAGTATTCTGAGACTTAAAGTGTCTGGAAGAGGTGTAATGGG
 GTATCTCCATCAGGATATAAAGTTGAAGAAAGTCTTCAAGAAATTTGATATTTAAGAAATGAGTCTTTGAGATATTTGAAGAG
 40 TCAATATTCTTAGGATGGAGTCTAGAAACCAACAAATTTTAACTAGTCTTTAAAGATTTAATTTAGAGTGTCTTGTGTTCT
 TTACATAGACTTTGGGTAAAGATATACATAAGATCAACCACTAGCATAGACTTTTAAATATTTATTTAGTAATAGCTAATCTTTG
 AGCATTTACTATGAATAACACAGTGTATTATGTTAATTTTACATATGTAGTCTCATTTAGTTCCTCACTATTATAGTTCTGTG
 ATTTGCAAGATCTAACTGTCCCTCAGCATTTTACTTACTTTATAAATGTTAATAACTTTTAAATTTATCATGTTCAACATAGA
 GAACGTAGAAAATACAGACTGGCAAAAGAAAAAATTTACCGTCACTCATTTTACCATCAAGAGCAAGATAAGCACTATCAACTTT
 45 CATGGGTGCGCTTTCTGATTCTCTCTATGGATTTTACATGTATTATAATCACAGTAACTTTTGGGTGATTAACCTCATATAA
 CTTTGTGCTTCCATAATTTATATCTTAAACAATTTTGATCTTGAAATCAATATTATTTTATAAAGAGGTATGCTAGCACACAA
 GGTGTCTCTTCTATTTTAAATTTGATTTTAAATAATTTCTGCTTAGTCCCTTCAATATAGGACATAAAGTGAAGGTGCTT
 GGCAACTGAAATGATGTAATGAGGAATTAAGACATTAAGAAAGAGAGTACTCAGTCTTTTCAATGCTACATGCTAATTT
 CAGTAATCTAGGCTGATTACAGTTGTAATAAATGAAGGAACACAAACTTCCATTAAATTTCTGATGTGAATTTTATTTATTT
 50 TTGTATTACAGTGAAGTGAAGTGGGTTTGTGTAAGAGAACTTTACTTTTCAAGAAACAGAAAGATCTTTGTCTGTATTAACT
 TTTTCTTTCTTTCTTTCTTTTCTTTTCTTTTGGCGACAGAGTCTCACCAGGCTGGAGTATGGTGGCATGATCTGGGCTCAC
 TGCAACCTCCACCTCTGGGTTCAAGTGATTCTGCTGCTCAGCCAGGAGTACTGGGTGTGACCAACAGTCACTAATTT
 TTTCTATTTTAGTAGAGTGGGTTTCCCATGTTGCCAGGCTGGCCTGAATCTCTGAGCTCAAGAGATCCACCTGCTCGTCC
 TCTCAAGTGTCTGGGATTACAGGCATGAGCCACTGTGCCAGCCTATTAACCTTCAAGGGAATATTAAGTTAGCACTGGGTGAG
 55 ATACGTAGCAGAAGCAAAAGATTGGTACATCTGTGATTCTCAGCAGCACAGAAGAGATGGTGGGCAGTGGTGAAGGAAGCC
 ATGTTAACTACTGTTTTTTTCCCAAGAGTAGTCAAGGGCCCTGGAGAGATTGCTGAGGTTCTCACTAGAGCCTTCAAGCAG
 AAGATGCTTCTAGGATGGAGATGACTTAGAAGGACACCACTGATTCAATGAAATGGACAAAGGGAGTAGAGACTAGAGGGGAA
 GAGGGAAGCAGAGGGAAGAGGGAAGCAGAGGGGAAGAGGGAAGCAGGATTGCGGTTTGTAAACAAAGATGCATCACCAGAA
 AAGTAAGGCAGTTTGGATGAAGCCATCAAGAATTTATCAAGGTATATCTTGGCAGAAAGTGAGGATTCTAGTTGGAGGAGC
 60 AATGGAGCTATGTCTGTCTCTCTTCACTGATCTATCTGAATCATGTTATAGGACTTGGTTTGTAAATCTGTGAACAGCCTCAT
 TTTAAGGGGAACCCACAATTTTCAAGGAAGCCAAAGAAATGTCCTGTTAATCATCTATGAGTCTATCTGTGGAATGTAGTTATA
 GACTATGGAACTCTTAAATCTGATGAGCAATTAATCACTGGTTAATTTTGGATTCACTTATTAATGCAAAATGCATAGGGGAT
 TTTTCACTCTCTGCCCTTCTCTTCCAGTTTCACTGAGCACCACAATGGATTCCATATTACTTATCCAAACCTACCTTGGT
 GGGTTCACTTTTACCTCAGTCTGGGAGTCTCAGTCCAGACTGTGAATTTACTGCCATTTCTGAGGGCTGCTTCCAGATGGGA
 65 GCGTATGAGACCTTCCCTCTGGCCCTGAGCTCAGTCTTCTGTTTATGCAAGGATGAGCACTTGTCTCGGGAATGGATGCTGGG
 TCCACCTGACTGTTGGCTGTCTTAACTCCCTAAAGGAAAGCTCCCTACATTTATGTGTCTGTGGTCCCCCAGCCTCTCTGTC
 CCACTGCTCAAGAGTCTCATTACCTTGTGAGTAACTACAGTGTCTACCTGAGATGGACTAAGCTTCAATTAAGTGAAGAGTGA
 CCCTCAAAATTTGAAGGAGAAATGTTGGAGGAGGACCTCTGATTAAAGAGACTTAAAGAGACTTAAAGAGACTTAAAGAGACT
 70 GAACCTTTTTCTAAATTTATGTGTGTACACATACACTCATAGGAGTATAGATGGATCCACATCTGCTGTATGCTGATCAT
 TGTGTGAGCTGGCTGAGTGCATGGAGGTCCCTTACGTTGTTTGTCTCACTATGGTATACATGCTTATAATTTCCATATCTTTT
 TTGAGACAGGCTTGTCTGTGTCAACAGGATGGAACAGTGAAGTGGCTTGGCTCACTGAGTCTCTGCTTCCAGCTCAAG
 TGATCTTTTCACTCAGCCTTCTGAGTAGCTGGGACTATAAGCATGTGCCACCATGTCTGGCTAATTTGTGTGTATGCTGATTT
 TTTTGTAGAGACAGGCTCTCACTGTGTGTCTCAGGCTGGGCCCCAACTCCTGGGCTCAAGTGTCTGCTCACTCAGCCTTCCAAA
 75 GTATTGGGATTACAGGCATGAGCCTGACCCGACCTCAACATATATTAATTAAGTGTCTCAACCTAGGACAAATAG
 ATGATTAGGATTACAAAATCAAAAGGATTTTAGGAAATTTCTTAAATTTTCTTAGGTGGCAAAATAGAGTGGCTGTGCTGT

398

399

400

401

402

GGGGGGGTGGGGGGGGGGAGAGGATATGTCTCTCAGAGTTTGAATTCATTCTGGGGTAAGCTTTGAATGGCTCTGGGAAATCC
 CAAAATAGATTCTACTGCCCTAGCCAGAACATACCTAAATCCTTGAAGTGGTCTGGCCAGAGTCACTGTGATTCTAGAGATA
 AGCTGTGCTGACCCAAAACCTTTCACTGGGGCAACTAAGCAGAGTCAAAGGGAGAGAGATTTCAGTTGATCATCAGGTACAGAAA
 GAGTACAGGTTTCATCTCTCTCAGTGCATCCATATGTGATGCCAAAGAAATATTAGTTCTATGCAAGAGAACTTGTTCAGACTGTC
 5 AGATGCCAACAGACCCTCACTGGCTAAATGTGCTTTCTGTAGAAATGAAACCTTATTCCACTTAGCCCCCTACCCCTACCAACAGAT
 ACAGTCTTCACTCCGTGCTAAAAATAGTGACCACCTAGTTGTCTGGGTCCATTTATTAATGACCAGTATTCTCTGGTGAGGGG
 ATGGAGGCCAGAGGGCTGACTTGAACAGGTGACACAGCTGATTACAGTCAAAGCTGGGGCTAGGACTACATGCCTCTCTCAGT
 CACTCAGCACCACATTTGTGAGCTCAGTTGTGTCTGGAAGGAGACCTGCAAATCAGGTTACAAAGGTTATTTTACATTTTCATTCA
 10 TAATATTGACAGCCCTTCTGTTTTACGCGAGCTGTTTGGTCACTCAGCCAGGAAGCTCCAGCTTCCATTTGGAAATAACTTCTCC
 AAGCAATTAACCTCTCAATCTCTGCACCCCTCAGTACCCAGACCCTAAATGAAAGCTCTGCCTCAGGAGTCCCATTTGGCAGTG
 CCTCCCCGTACAGGGAAGGACAGCAGTCAAGCTGAGCCACTGAAAAAGCCATTTATCACACAGGAATCTGAGCTCTGCAGGG
 GTCAAACCTGGCAGGCTGCTTGGTCAAGGCTGACAGATGTCTGCTGTATGCCAATGCTCACATCAGTGGAGGCGAAGTGAATAATC
 AGTGCAAGACAGGAATCCAGCCAGTGTCTCCAGGGGTGAACAGTGTCTATTGCAAGTGAATAACATCAGTTTCAACCTTCAT
 15 TTCTTTTGTAGTGGCTTGGTCCCTTCATAGAAGACTATCTCAGGGTTTTTTTGTGTTTTCTGTACAGTGTAAACAGTTTTACAAA
 CACAAGTTTTCTCTCAACATGAGGTTGGAGGGAAATTTATCTGTGCTGTGAATGAAAGGCATTGATATCTCTGTTTTATTACA
 AAATTTAGGGGTAGTGAGGATGTTACTGGGATAATGTTTTTAAAAAACAAGTGGATTAAAGTTATATTTATGTGGGAGGGG
 GTATTAAATGATTCACTGGAATATATTAAATGAATGAATATATTCAAATATATGCAATGAGTTGTGGCTACTTCTTTTAGAAC
 CAGTAAGATGTTTGTCTTATATATCTCTCTTAAGGAGCGATTTTGGTCTACTCATAGGTTTTCCACCCATCAGCAGCCATATAGC
 20 ACAGTAAATGGGGCTCAGTTAATTTGCAGCTATTTTATTTGGGTGTGACTTCTCATCTATATATTACTACTTAGGCAGAGAA
 AGGTGTACTGTAGTAATAACCCCCACCCACCTCCTGTCAAACTCTCAGTGGCTTAATTAAGCAAAAGTTTATTTTCACTCA
 CACTGCAATGCTAACATGGGTGAGCAGAGGCTGATCAGAGTCCCCAGGAACCCAGATGATGGAGGCTTCATCTGCCAGGAATTT
 CCAAGATCTCTGCAGCAGTAGGAAGGCAACATGGCAGACCACTCACTGGCTCTTACATCTTGGCTCCAAAGTTACATCGCTTCCA
 CTCAACATTTCTGCTGGCTGAACCATGTCTATGGTCACACCTTTCTTCAAAGGGAAGAGTTGAGAAGGGAAGGTTGGAATAATG
 25 GGGGAAAAGCACCAAGACTTCCATAGGAAGTTGAAGAGAAACAGACTGTGATTGAGCAGAGGGGATTCTTGTGACAGGGACAC
 AATAGTCAACAACTCACTTAGACTAGATCTTCAAGGGGACATTTTCAGTTTACACATGTTGTTTTCAITGGCAACTGTAGTCAATG
 CTATTGTCACTTGGGAACCATGATCAGCAACATATAGCTAACCAAAATTTTAAAGTACTCCATTGGCTCTGCTCCAGTTGGTG
 AGTAGAAGGAAATACAAACAGGCTTGTATTAGCATAAGGTTTATACTACTCCATTAGCGCAACCTTACATATATGTAACACTTTA
 AAAAGTTAAAGCTTTACACATTATCTTCTTTGATCTTCATAACAATCTATGCTCTAGATAGGGCAGATTTTATGATACATTTT
 30 TAAGGTAAAGAAACAGCTGGGGAGAGAGAGATTGTTTTTGTGAGGGGAATTAACCTTTTATTCCCTTAACTTACAGCAATACG
 ATCTTTATTCTGTACTGTATTCTTTAGAATTTAGAATAGTCAGTAACAATATCTACTGAAATACAGCATTGGATTAACTAATGTG
 TCTACACATCCACTTATTCTTAATAACTTTCGATGTAGAGAAATCATGCTGTGGGTAGAATAAGGAAGATTTCCTCCCATCATG
 TTGTTGGCAAGTGGCCAAAGATGCAGAGAGCACCAGGAGCTCTCTGTTCCATGGCAGTTCCAGCCATCACTCAGCAGCACTGGA
 CTTGTCCCTTAAATCTTCTGGAATACCAGAGTACAGTACTGATAGGTTTTTTTTTGTGTTGTGTTTCTTTCTGCACTTCTCTG
 35 ATTTACAGAATTACCTTGTAAATAGCTGTGTGAAGGAAACCCACCATGGAGCGATCTATTGCTCTGTGCAACCGCATCTCCAG
 TGGGTACAATGATGGTTCTCAGCCGCCCCACGCCGAGCTCCAGCAGAGTCTTCATCAAGTTTCATCAGGTGGCTCAGGTGAA
 TAAGTGGTTTAAAGCATTGGCTTGGGCTATAAGGTAACTTTCTATCCCTTTTCTCCAGCTTAGTCTTATTAGAGCTGTT
 TTTTCCCTCCTGAACCATGGCGAGGGGTGGAGAGGTTTGTGTGCTTCAACCAGATCTAGATATGGTGACTGTCTCTTCTTCCA
 TACAAGGACAGTGTGGAGGGGAGGGGCCATACAGGCCATACAGGGGTGAGGATCCAGTTTATGATCTGTTTAGACCTTTAACA
 40 TTTTCAAAGATGCTTACCAGCTACATTTTCCGAGTCTGGGCCACATGGCAAAGGAAAGGGCAATCTAAAGATTACTTGA
 GCTGGACATCTCGATTGTCTTAGGCTTTAAGCCCATGCAAGTGTGAATGGCTGCATTTAATGTTTGAAGGGGCAATTTATAAGA
 GGAATAACAAGTACTATGAACCCATATTGAAGTTCCCCAGAGATTCTAGCTTCTCTGTCCAGTTACTGTCTATATAGGCACTGG
 CAATGATGGGAAATAAGACAAGTCTTACCCTCAAATAAAGTCTGGTAAATTTGAATAAATAAAGATTACATTTAATA
 ATATCTTTCTCAACTCTGGATGGTCTAGACCAGTGTCTCAAAGTCAACAGCTCTGACTTTGGATCACCTGCTCTGATATTAA
 45 TAAAGGTATATTAAAGTACAGATCTCAAGCCTAACCCAGATCCAGGCAATCAGAATGTCTGGGTTAGGTCAGAAACCATTTGT
 GTTAAACAATATTGAGGTGATTCTAAGAAAGCAGTCTAGAAAGTGGTCCACAGATCAGCAACAACAAGGAGAGAGATGT
 AATGCCCTCCAGATGTGGAATCCACAGTCTGAATAAAGCAGAAGGGGAGACATGGACAGGAATTTGCAATGCCTCGTAACATAGT
 TTTAACCAGCTTTAAGGGAGACTCAGCGCACAGAGACAAGAGGAGGCTCTAAGCTCCCATATAACTGACATGTACAGTGAATG
 50 GCTCAATCTCGAGGCTCAAGGAGACAAGTTCCGATGTCCACATGAAATCAATAAGGTGAGTGTACTGTCTTCTCTGGGGCCCT
 TAGCAGCATTCTCAAGATGTGTGCCAATTTTCTCCTTGGTGGGCGAGCCAGAGAGCATTTCACACCAACCATCCCTTGTCAAC
 CAGGCTAAGTGGCAGGGAGGCAACCTTAAGGAAATCCATAGGATGGAGAAGTCAATTTTTAGAGTAACCTGTGATTTTGTCTGG
 CCTCAGACAGTGTCACTGCAACATTTCTGCTGGACAGTGTGAACAAATGTGTGCTCTTCCATGTTCATAGGCGATGGAATTT
 CAGTTACCATCTTTGACACTGATTCCTCGCTCCAGCTCTTGTCTTAAATGTGTTCTCAAAGGAATTTGTGGTTGCGTTGACCA
 55 TAGGTGAGTTTGACATTGAGTGTAGTTATATAGTGATATATTAATAAATCTAGCTATCCAGAACCTTGAAGAATGACATTCGGA
 TAGTTGAATTTTACCAGATAATTGGATATGAGTTCTTCAGATACCATTTTGTAAATACATAATGTTTTATTAATGAATATTTTCTT
 AAATGCTCTGTACATTTTCTACATTTATAGATTTTACAGAATATACCTTTATCTTTATGACATAGGGCTGTTTTGTCTGTTTCT
 CTTTTTATAGAAACAGGGTCTTCTCTGTCTCATCAAGGCTGGAGCAGGCTGGCAGATCATAGCTCACTGCAGTCTCAAACCTCC
 TGGGCTCAAGCAATCTCCCACTCAGCCTACCAAGTAGTGAACCATGGGTGCACACCATATGCCCAGTATTTTAAAAAT
 60 TTTGTAGAGATAAGGGTCTCCCTATGTTGTCCAGACTGGTCTCCAACCTCTGGCCTCAAGCGATCTCCCATCTCGGCCTCTAAA
 GTATTGGAATTACAGGCATGAGCCACTGAGTCCAGCTGGAGCTGTTGTTATAAATATAAACCAGTGAATATACCGAGGATATAAA
 TGATGGCATGGGTTAGATAATGACTGCTCTTTGAGCACTTTCATGTAAGAGGACCTTACTATACTCAAGCCCGATCTTCCAAA
 CTAGCATGGAGAGGAATCTCTTTTTAGGGAGAGATACCTAAGCTCATTACCCCATCTGTTTTTCCAGGTGTTGAGCTCCCTTTT
 GGGGAGTCTTTTATTATCTCTGTTATCACAATGCTGGGCTCTGGGAGGCCCCCATCTCCAGTGGTCTGATCAAAAAGGGGATC
 65 ATCTTTAGTCACTCTTCACTTCTTAAACGGTCTGTGTAACAGTGGAGGAAACAGTTGAAAGATTGCCACATCTCAGAGGTGAC
 GAGAGAAATAGTCAAGAGATTAAGAAGCCTTCATGTCAATTAGCTTATAAGAGAGAGCTTGCTCCTCTTCAGCTTGGGGTCCCC
 CACAGCAGTGTCTCTGTGCTAGTACTTTGACCCTCAGGGTGGTCTGCATAGTGAATTAGTAAGTCCAGGGTTGAAGCAAAAGTCT
 CCCAAGTTGTTGATTTCACTTCCGAGGGGAATAAAAAATATCTTTATCATTTTTGCTGTTACACTCTTGTCTGTGAGCCCCCTTCC
 70 ATGCCAGGGCTCACTGCAACATTTGTTAGAGTTTATGAAGAAGAGCTCTCTTGGCCATCTCCAGTGAATTTGAAGGGGTCTGAC
 TCCAAGAACTCCAAGTTCTTCAATTGTGGAGAAATGTTACTCTGAGGCCACAATTTTATTAAGTTTGGGCACAGTGTCTAAAGGG
 TTACAGTAGTCCCCCTTATCTGAGGTTTTGTCTCTGTAGTTTTCAGTTATCTGAGGTCAACTGCAGTCCAAAAAATTTAATGGA
 AAATCCAGAAATAATTCATAAATTTTATTTATTTATTTGTTAGAGCAGTCTCACTGTCTGACCCAGGCTGGAGTGGAGTGGC
 75 TCAGTCTCAGCTCACTGGAATCTCCGCTCCAGGTTCAAGTAATCTCTGCTCAGGCTCCCAAGTAGCTGGGACTACAGGCGT
 GTGCCACACGCGGGTTAATTTGTATTTTATGAGAGACGGGGTTTCCCATGTTAGCCAGGCTGGTCTTGAATTTGGACCTC
 AGGTGATCCGTCACCTCGGTCTCCCAAGTGTGGGATGAGGCATGAACCAACCAAGCTGGCCAAATTCATAAGTTTAAAAATG
 CATGCTGTGCTGAGTAGCATGATGAATCTTAAGCCATCCCATTTCCATTCTTTCTGGGACTCTTTCATATCAGTCACTAAGTAGCC

GTCTTGGTCATCAGATTGACTGTCTATGGTATTGTCAGTGCTTGTGTTCAAGTAACTCTCACTTTGTTTAAATAGGCCTCACAGTGC
 AAGAGTAATGATGTTGGCAATTGGATATGCCAAAGAGCAGCCCTAAAGTGTTCCTCTAAGTCTTTACTTAAATAGGAAGGAAA
 AAAATCATATGCTGAGGTTGCTAAGATCTAAGTAAGAAGGAATTTCTATGAAATTTGAAAAAGAAAAGGTTCACTTCTAGT
 TTCTCTTTTGTACTTCACTGCAAAAAGTTATGGCCACAGTGCATGATGGGAATGGCATTACATTTGTGGGTGGGAAACATGAAC
 5 AGAAATGTGTTCCACTTGACAGCAATCGGGTTTGTACTATGCACAGTTTCAGGCATCAATTAGGCATCTTGGACTGTATCCCCCT
 AAGGATAAGAGAGGACTCCTTATGTTGTATGATAACATGATTGGCAGACAGTCACTTCATGTCTTTGCTTCTGAGAAAGCTGGTTA
 TCACATCATGGGGAATGGATTCTGTGAACCTGCTTGTGACTTGAATGACAAAGTATGAAAAAGAAAACATAGATCTGGCTGCTCCCTT
 TCTGTGCTGGTGAGCAGCGGTTCCCACTTCCAGGTTTGAAGCAGGGGTGAACCTCTAATGTCTCTCTCTGTCTTGTCTGAGAA
 10 TTGATCTAGTCTATTAGTCTTTTATGTTCAAGGTTTATGCTGTGTAATGGAATGTCACTTGTCTTCTAGTCTATAGGCCCACTTCTG
 AGAATCTTGAAGGCCCATCAAGCACCTCATAGAGAATAACACACAATAGACTACTGAAGCTCCACTCTTAAATACATGCTCTTC
 CCCATGCCAGCAACATAGTCAGCATTCTGACATCACATTTCACTGTTAATCAATGCAGTGTCTCTGGAAGCATTGAGAAGACA
 CCAAGGAAGGGAATCACATGGCTTGGGGACAGGAGTTAGAGGGATAGTGTTCATATATATTCTGTACCTTTTAAATTTTGTAT
 CAGGCTCTGTGTTTTGAAAAGAAAGAAATTTAACATAAAAATGATAAAACCCGATTATAATGTTTAAAGTTATATAACAGATT
 15 AAGCATATCTTGTGTTTATAAATATATTCTGTGATATTGACATAGCTGAGGTTTAACTGGGGAGTCATAATCTGTACCTTTTAC
 ATGAATTAACCCCTGCTCAACAAATCTGGATGGGGTGAGATCATGGCACAGGATGCAAAACATGCAAGGCTCCTATTACAGACAAT
 GCACACTGCCTAGCGGGTACCTGTGATTGGTCTGTCTGCTTGTAGGTTCTCGGTGAGATGACTGAGCTGCTGCTCTCTCCAGA
 GACATGCAACAATTAACCGCGAGCCTATGGAGAGTGCCAGCTTCAAGATCCCCATTCTGGGTGTGCATCTCAAGGCTCATCTC
 CCTGTATGAAGCCATGCTGACTATCTGGAGGACGGGAAAGTGAACCTCCATAAGCTACTGGCCCTATACAATCATATCAGTGAAT
 20 TGGTCCAGCTGCAAGAGGTGGCCCCACCCTTGGAGGCTAAACAGGACTTGGTACACTTGTGACGGTGAGGCTCACACTGGAGGAC
 AATTACTAAGCAATCTTGTGTGGCAGGTGCCATTCTATACCCCTTACCAATATTAAGCTGTAGTCTCTATAAAGCTCTATGAA
 GCAGATCCTATTACTATCTCAACATATAGCTAGGGATACTAAGCACAAAGATATACCTTGGCAGGAGACCACATTTAAGT
 AGCAGAGCCTTGATTAGACCCAGGTGGTGGGACTCTAGAGACTGTGCCCTTCAAGCTTCTAGGACTGTTTCACTACCTCTACAAA
 AGCAGTCTCTAAGCTCTCTGGGAGGAGCTGATGGCAATCAGGATACAACTCTTGGTAACAGATGGAGAGAATGAATGTGCTCTCAT
 25 AAAAGGGCAGGCAGTAATTTAAAAACAAACAAAAACACCCAGGTTATTATTGGTTCCTGGCTTAGATCTTGTCTTGGAG
 ATATTTCAAGTGAAGATGAACACTTGTCAATGGTGTGGGAGACAGGATTTGCATTTGTCATATGGGGTGAGATCAGATGATGAAT
 CCCTTCCAGACTGCAATTCCTAGTTTACCACTGTGTGACTATGGACATATAACCGTCCAGATTTCTCTCCCAACAGAAATTA
 GNNNNNNNNNNNNNNNNNNNNCCAGTTCTAAAGTTACACAGTTTTTAACCTGCTGTTTTGGAGAGTAGAATAATGATCATAACCT
 CTCTGCTGCTCAGCAGCAGATTTGATAGAACCCTGGGCTTCACATCAGCTGGTGTGTGATCCTAGCCCTTCACTTATTAGCCAG
 30 GTGACCTGGCAGGCTCTGTCTCAGACATCAATTTGTAAGGATGAGTGAATCTTAACATTTCTTGGAGTATCTTGTGATCTTGTGAT
 GAAAGCTGTGAACCTTCTTCCAGAAAAATGTACATAAGCCATTTATTTTAAATATGCATGTAATTTCAAGTTCTGAAATCCTTG
 AAGCTATCCATAGACTCAAGGTTAAGAATAAGATTATCTAAGGACTTCTCTCTAATAATTTTATAGTTCTAAGATACATGAAA
 CTCATATTTTCTTTTCTTTTCTTTTCTTTTGGAGACAAGGTCTGGCTCTATGACCTAGACTGGAGTGACATGTCATCTCAGCT
 35 CACTGCAACCTCTATCTTCCAGGTCCAAGCCATCTCCACCTCAGCTCTGAGTAGCTGGGACCAAGGACACAGCCACCCAGC
 CCGGTTAACTTTTGTATTTTGTAGAGACAGGGTTTGTCTATGTTGCCAGGCTGGTCTCAAACTCCTGAGCTCAAGCAATCAAC
 CTGCCCTGGCCCTCCAAAATGCTGGGAATACAGGCATGAGCCACCATGCACCCAGACTCATTAACTCTTAATAGCAATTAATATGT
 TTTACACTGCTTTTGTGACTTTTGAACCAAACTGTTTGAAGCTTAAAGAGTAAACTACTGGCAAGGAAAAATCCAGAAAGAAC
 40 ATCAGCTGTGGGAGAGGCAACAGCATCTTAGCAATGAACCCCTGTTCTGCTTGTATCTGCAGTTATCCCTGGATCTTTACTACAT
 GAGGATGAAATCTATGAGCTTCTCTATGCCCGGAACCAAGGAACACAGAGCTCCAGTGAGTTTTTCAATTAAGACTCCACATG
 TAACAGGTGCTTTTACAAGCTTCTCTCGAGTTCATTCTCAGGAACAGACTTTCAGTTCAAGTTTAAATACATGACTGTTTTCT
 TTAGTGCTCAACCTTATGCTAGGAACAGAGAAGCTTTTCAACATATGCTGAGGAATAGTCTCTGTCCATTAAGAGCTGTGATA
 45 TAGTTAAGGGATAGGCTAATGTGTGACCAAGTAACTAGTGAACAGTAAATACTATATCATCAGAAATGCCAGGTGTGGTGG
 AATCAGTCAAGTGGTTTCAAAAGTAGAGAAGGAAGATACTTTGTGCAACAGAGTGACATCCCCCGCATTAAGAAGAGTCCACAC
 ATAAATTTCTTTTCTATGATTCTTGTATGATAATGAGAGTAATATGCGTACTAATCAGAAGCTAAATTTCTGAAGATTTCCAGGTT
 GGTAGATAGAAAAGCCCATTTCTCTGTAATGTTCTGGGTGAAAGAACAGTCTGCTGAGTCTTTGACCTCTATGCTGAGAAAT
 50 CCTCAATCTGCTTACACAGTCTGGCAGTCTGCTGAGTAGGAATTCACAGGTTATCTGCCCTACCTCCCAAGCTAAGTAAATC
 ACTTCAGTCTCTGGGACGTTTCCAAACCCCAAAACAAAGTGATACTCAAGGGAAGAGAGTTGCCACACTTAAGAAATCCAGCTCA
 TCTATTGGGGTGGCTAAATTGCACTCCTCCACACAGAAAGATCAAGTTCTAGCTTCTATTTGTAATGAAGATTTCACTGAAATA
 TTTGGTAGATTCCATTTTCAAGTTAGAGGCAATTTCAATGGAAAGGTTACATTTCTGTTTTTTCAGAGAGATTTAATTTGGGCTGAG
 55 TTTCAAAATACAGTCATGCACACATAATGACATTTTGTGAGTAGACCTCATATACACAGTGGTCCCTTAAGATTAAATGG
 AGCAGAAAAATTAATACTGCTAGTGACAGAACAAATTTGAACATTGTAGCACAACACATTACTCACTATGTCTGTGATTACTGG
 TGTAACAAACCTACTGAGCTGTAAAGTCTAGGTTATACACTACGTACAGTACATAACTTGTATAGTAAATATACCGGTTT
 60 AAGTCTTACTATACAATACTTTTATCATTATTTAGAGTGCATTCCTTCTACTTAGAAAAATTAAGTGAAGAACAGCCTCAGGC
 AAGTCTTCCAGAGGTGACAGCTCCATGATGTTATGCCCCCTAAAGACCTTCCAATAGGACAAGATGAGGAGTGGAGACAGTGA
 TATTGATGATCTTGACTCTATATAGACATAGGCCAATGAGTGTAAATGTACCTTAGTTTATAACAAAGATTTAAAAATTAACAT
 65 TTTTAAATAGAAAAAGTTTATAGAATATGGCTATAAAGGAATAAAGTGTACAGCTATAAGCTATAAAGTGTGCTTTAAGCT
 AAGTGTATACAAAGAGTAAAGTTAAAAAATTAAGGCTTTTACAGTAAAAAAGGTAATTTATCATTGAAGAAAAATTTA
 AGAAACTTAGTGTAGTCTAAGTGTACAGTATTATTAAGTATATAGGAGTATACAGTAAATGTAGGCCTCCACATTCACTCACCAC
 70 TCACGACTTGGCACAGTAATTTCTAATCTTGAAGCTCTATTCTGTTAAGTGCCCTATACAGGTGTAACATTAAGAAAAATTT
 CTATACCATATTTTACCTTTTCTATGTTTATAGATATGTTAAGATACACAAATACCATCATTACAATTGCTACAGTACTGAGTATA
 ATAACCTGCTGTTATAGGTATGAGCTAGGAGCAGTAGGCTATACCAATAGCCTAGGTGTGTAGCAGGCTATACCATTAGGTT
 75 TGTGTAGTACACACTGTGGTGTCTATACAATGACAAAACTCACCTCATGACACATTTCTCAGAACATATGCCCCAGTCAATGAAGTGA
 TGCATGACTGTATTAGAAAAGAGCTTGTCCAGGCTTCCGATGATTTTTCTGTGCTTCTGCTTTTGTAGTAAAGCTTTTCTTTA
 TTCATATTTCTACTGCAAAATGTGACTGGAGAATAGAGAGGAAACATAAATGATCCACTTTACTCTTGTGTATAGCTCTGACAAA
 GGGTTTAAAGGAGGGAATGCACTCAGGCAGATTGAGAATTTCAATTTATCTGTAGCTGCAGATAATGTGTGAAGAGCACT
 CTGGAACCGTAAGCACAATGCCTTGTAGCCAAATTTATGTAGAGATTTCAATTTGCTGTGGGTTCTCTGCTCTTCCACTG
 AACATAATTGAAGATTGTCCATAAATGTAAACCGTCAGGTAGTGGGAAAAGAAAGAGCTATAGGTTATAATATTGCATTGTAGTCAT
 70 GAGGATTTCTCTAATATTTTCAATTTAGCCACTAACACCTTCAAGGCCACAGTAGTAGTGGACTGGGCTTCTGGAGTGTCTCCCA
 AACCTGAATCAAAAACCATTAGCAAAACAGTCAGAGGATGGTGGATGTAAGTACAGCTGTGTTTCAAGCAACAGAACTAGGCAAT
 GCCTGGCTCAGTTTGTATGTGGGTAAAGGAGAGGAAAGCACAATGGTGGAAATGTAAAGGCACGAACTTGAACCACTTACTT
 CTCTTACTGTGGCTTTAGAACAATCAAAAGTTACATTTGACAAACACACTGGACTCATATGAAGGAGCTGTGCTCTCTTTC
 AAGACCTAGAAAAGCATATGCTTAAAGTTTGTGAGTTTATAGGAGTACAGAAATGTTGGATGCAATTTGATGATAGTAAAG
 75 GGTAAATCAGGTAACCTTAAACCTGAAAACCTTTGTACTGCTTAATTTCAATTTCTGTGCTAATTTGCTGAGGAGGGGTATATATTC

TCATACTTATGTCATGTATCCTCGTGGACAACCTCACATGTAACAATGAAAACTAAGAGCGTAACGGTGAGAAAACAGAGGATTAAAC
 AGTGGGACAGAGCACTTCCAACCTGGGCTGTTGTAGAGCTTCTCAAAGAGGTACAACCTGGAGCTGAGTGATGAAAAAGGGT
 AGAGTGAAAGGAGAACATCCTCTGCGCAGTGAACCTAGGAGTAGCCAGCGTGATAGTATAATTGACGTCTAATGATTCAAAGTAC
 ATGGCCACCCCCACATGCTGCTACAGCAAGGCTGAGATGTGACCTGCCACATCTTTGCCACAGCTAAAGGAGCGTTTCCC
 5 TGTTCCTCTCGTTGAGGTTGTTAAAGGCTTTTATCCAACCTGCCAGCTCTTTGTCTATTGACTAAAGGGAGAGAACCCGGTTT
 CTCTTTAGTAATCACCAAAAAATCTCTTTTTCACAGTCTGTCTTCAAGAACTATGATCAGGACCAGGATGGATACATTTCTCAGG
 AAGAATTTGAAAAGATTGCTGCGAGTTTCCATTTTCTCTGTGTGATGGACAAAGACAGGTGAGGTTTGTACTTAGGAATATG
 TGGTTATGAGCCCATTTGGTGAGAATAGGTTTATAGGTATGTCACTAGAGAATTTGAAAACCTCAGATATGTTGTGCTGTGATCAC
 TTAAGAACAGACCATGAAATATGCATTTCTTTAAAAATATTCTGGGCTGGGACAGTGCGTCAAGCTGTAAATCCCAACCTTT
 10 GGGAGGCGAGGTGGGAGATCACTGAGCTCAGGAGTTGAGACCAACCTGGCCAACTGGTGAAACCTGTCTCTACTAAAAAT
 ACAAAAATTGAGCCAGGTGGTGGTGGGACCTGTAATCCAGCTACTCGGAGGCTGAGGCAGGAGAGTTGTTGAACCCAGGAG
 GCGGAGGTTGAGTGAAGCCGATCATGCCACTGCACTCCAGCTGGGCCACAGAGCAAAACCTGTCTCAAAAAAAGGAGGAGGAG
 AAAAACTGAATTGAACATTCATAAATCTGCCACTTTATAAATAGTCAACTATAAATAAGAAAAAGTTAGTCTTCTCTTGTCTT
 TGTCTTACAGATTGTTGGAAACCACTAATACTTATTCATCTTTGCACTTTTACTTTTCTCAAGGTTAAATAAATCTATCTTGG
 15 TTCTCTATAGGAACTAATCATATGGTTAGTGGTTCCAGTTAGGTACTGTCTAAAGTCAGAAACCTGTAGCATAGACATTTCCCT
 CCCTATACACATGTACATGTTACATTTGTTCTTTTCAAGTCTTATAGATAGTGGTCAAGTTAGTTAGGAAACCTAGTTTGGCCA
 AAGAACACCTCTGTTGGAATGAGTAATGCTGCTTACCTTACCACATGTCTATCTGTATCTTGTGTTAAAGAGAGGCGCCATGG
 AAGTAATCATGAGGTAGCACATACCATATTACCACTGAGGATAAAAAGAAAGGTGAGTTCTAAGGCTAGAAGCCCCCTTGCTA
 CTGCGCTCCATGCCCTTATACTCACATCTTGCCTTGTGTCATCTGCCGCGAGGAAAGGCTCATCAGCAGGATGAGATCAGAC
 20 CTACTTCATGAGAGCCAGCTCAATCTATTCCAAGCTGGGCTGGGCTTTCTCACAACCTCCAAGAGACCACTCTGAGGCCA
 CTTTTTGTGACAACCTGTGCTGGATTGTAAGTTGTTCTTAGGTGCTCCAGGCTGAATTTGGGGAAGAGTGTGGGATACCTTTAAG
 ACAGGACAGACCTCACAATCCTTATGAACCCATCCAGCTTGGAGCCAGACAGACACCTAGAATAACCTAGAGCTCAAGCGTGT
 GGTTTTACCTGCACTCATCTCTCGCTTCTCTGTTTCTTTCTTATTGCAATGAGGCTTAGATAAATGGTACAGAAA
 TGCTGAATTAGGATATACCTTTAAAGTATAATATTCAATGTGCTGTTTCAAGTGTATAACAAGACATATGAGATACCTTCTGTCT
 25 TTAGGAGATAACCTTGGCTATGCCCTCTTCCGTTCCACTCTGACCAATCGTTTCCCCCTAACTCGGGTCTGATGCAAGGCTC
 TATATCTCTTCACTTGGAGTCTGAGGAACTGTTGCGCCAGATGATTCACTTCTCGAGAATGTCTGGGTCTGCGGCTGTC
 TAGTGAGAGCCAGGTGTGGTGGCTCATGCTGTAATCCAGCACTTTGGGAGGCCAAGGCAGGCAGATCACTTGAAGCCCGAGTT
 CGAGACCAGCCCACTAACATGGTGAACCCGCTCTCTACTAAAAATCAAAAAAATTAGCCAGGTGTGGTGAACATGCTGCTGT
 30 ACTCCAGCTTCTGGGAACTGAGACAGGAGATTGTTGAACCCAGGAGGTGGAGTTGCACTGAGCCGAGATCGCACCACTGTC
 ACTCCAGCTTCTGGGAACTGAGACAGGAGTGTCTCAAAAAAACAACAAAAAATCTGCTTCTTGAAGAACTTGTATCAGCATAA
 AACTCTCTCATGGAATTAAGGTGAGAAGGACAGACATGAGAGATAAAGAGGTTTCTTCCCACTTGAAGTGAAGAGTAAATG
 AAGGAAATAAAGGAATGTCACTTGTAGCCTCACACAGATGATGAATGACATGTGGTGCATTCTGTCTTCTGATGCTC
 TGGGGAGTGATCAAAACAGGATATCGATGTAAAGGTAAGACTCAATATTGTTGACATATTCTGGTGTATCAGTCCATTCTCAGC
 TGCTATAGAGAACTGCTGAGACTGGGTAATTTATAAGGCAAGAGGTTTAATTGACTCAGAGTTCCACAGGCTCGTGAGGCTA
 35 AGGAACTCACAATCATGGCAGAAGGGAAGCAACACATCTTTCACATGCTGGCAGGAAGGAGAGTGTGAGCAAAAGGG
 GAAAGCCCTTGAAGCAACAGATCTCATGAGCAGTCACTCACTCATGAGAACAACTGAGGTTAAACCGCCCAAGGTTCA
 TTTACCTCCCATGGGCTCCCTCCATGACACATGGGGAATTATGGGCACTACAAGGTGAGGTTTGGATGGGACACAGAGCTAAACC
 ATATCAGCTGGTCTTAGAGTCCCACTCTAAACATTTTTTACCATAGTAGTTGTCCATTTAGTCCACAACCTCTCAGCAGAGTT
 40 CAGAGTCTCTATCCCAAGTGGTTTCCCTCGGACACCCCGGTGAATGACCGCCACACCGAAGAGAGAAATCGTGGTGGCAGAGA
 TAGGCATTTTCTCTGTATAAAATCTCTTCTGTGCTGGCTGGCTAGAACAGGATAGCAGGTAGGAGATGGTGTCTCATATAG
 TCAATGGAAGGTTGGGTCCTCAGTGAAGAAAGATAGATCTCTTCTGCAACAGAGATAAATGATTACTAAAGGCCCTTGTGAGCTTT
 CCTTTATCACTCAGGACATAACTGTCTTCTTGTGACTAGGAGAAATCAGGAGTGAAGAGAGAGGAAACCTTTTACTGCAAGAAAG
 45 AAAATAAGACCTAACAGCTGAGTGTTTCCGGAGGCTCTCCCTAGAGTAGGCAGAAATGTATGGGATACCAGGACACCATCTCTTCCC
 TCCAAGATATCAGGATAGTCTTCTGATGCTGAGATTCACTGATAAGGGCTACATCAAGAGTGTGAGCTCTGGGCTTCAACAAGTG
 AGAAGATGCTAGCTTCTTAGGAAATGTTAAGTGTCTGACTCCAGAAGATAGAACAGACATGTGTGACAAAGAACGATGCTATGA
 ATTTGGTGTGAGACACACTGGGGAAGAGAGAAAGTGAAGACTTCTTGACCCAGGATGTCTTGTCCACAGACTGCGGGATGAAC
 TGTCAAAACAAATGCAAGATCTGGTGTGTTTGAAGTGAAGAGGAGCAAGAACCCAGTAGCTCCACAGAGAACCACTTGT
 50 CTGTGGGCGCAGTGTCAACCTTTGCTCATTGGGAGCCAAACNN
 NNN
 NNN
 NNN
 NNN
 55 NNN
 NNN
 NNN
 GATAGCCCCAATTTTCTCAGGAGAGGAACCCCAAGCCATTAAATTAAGACCAGGTCTAGTCTGAGGAACCTGAGGGGCCAGG
 TAGCAGGTAATTGTCAAAATCTAGAAACAGAGGCTAAATGTAGAAAGGAAGGCGGGGGGCAACCTCCCACTCAAGTGGAGCTT
 60 GCAGATTAATAATCCAAATCATCAAGGAAATCCTAGGACTGAGACAAACATTCAACATTCAAGAAATAAATAGCAAAATTCAC
 TTACATTAATAATGCAACACAGTACAATAAGGAATGACTTTGAGTATGTTTGAATGCCCCAGATCTAAGTGCAAAGAGCAG
 AATAGACTGTCTGTCTTATGAGGATGTTCTAGTTAGGGGGAAGATAATATACAAATATAGAGCAGTTTAGAAACAAATGCAAGA
 GTATATGCTAAGAGCCAAATAGGTTGCACTGACAGCAATGACAGGAGGACATAGCAGAGAGATCGCTGTACTGGGCTGTGGGA
 CTTTATGGAGAAGGTGAATTTCACTAAGTCTTGAAGGAAGGTAGAATTAAGTTATGGGAGGAGACAGAGCACATTCAGATA
 GGTATGACAGTAGGAGCAAAAGGCCAAGGCGAGAACAGCTTTAGTACTATTGGGATAGTGGGAAAAAAGAGGTGTTAAGGCGA
 65 TTTAGGTAAGAGATGAAGTGAAGAAATGAGACAGTCTAGAGAGTCTTAAATGACAGGTGCTGTCTGTATGATAAATGAGGAGCT
 ATTTAAAAAAGGTAACATGAAGGCTTGTGGGAGCGTTGGGCGCAAGGCTTCATAGTGCTATACTAGGCCCTGATCTCTGGG
 CTGGCTGGTTAGCCAGCATGTCAAAACATGATCACCTTGACTAACTAAAGAACATATAGGCTTTCAGCAAAATCCAGTCTTAT
 TAGGTTAGTGCCAGTTTAAATAAGAGCTGTGTGACTTCAAGTGAACCAAAAGGGAATAAGAAATGAGTTTATTATATAA
 AGCACTTAAATCGGGCTTAAACAGTATGTACCATATGTTAAATCATTTACTCTTTTGAATAAGCTCCCTAAAGTGGTAAGGCCA
 70 CTATCGTTACACAGATGCTAGAGAAAAGTCCATATAGTATACATTCTGCAATTAAGCACTTCTAATGTTCAAGTGGTAAATAT
 CCACATGCAATTTATGATCAATTAGATCAAGCTTAAGTCTTCACTTCCATGTAAGAAATGCACATTCCTTTTATCACATCAGC
 AAGTAAAAATTTCTGTCTTCTTAAATCTTCCCTTACTATCTAATAACAGGCTGACTTCAAACTTGGGGTGTTTTGT
 TCTTAGGGGAAAAATCTCTTAGGCTTTTCTAAGAAAGATATGCTAATCAACTAAGAAATTTAGTGTCAACTTTTAAATAGA
 AATCAAAACACCATTTGTAAAAATAGGCCCTGTACCTGTATTTCATTCATGCACTCTGTATTTTCAAGTTACACATAACCTTAG
 75 GGCACCAATTTCTGTACATAAAATGCGAGATTTCAGTGGAAAAAGACAGCAGAGAACAGCTGAATCTGAGGCCCTCAAAAAGGA
 ATCCCTGAAGGGCAGTTGTTAGAGATTTCTCCTCTCAGGCCATCTCTCCCTTTTCCAAACCTGCCCCACAGTGGTAAAGATAA
 GTACTTGTGAGGAAGTAGACCAATAGGTAGGATAAATACATATGATCATGGGCAACAAATGAAAAATTAATATATTATAAAG
 TTGCTAAAGTCAAGGTCTATTATATAAGGCAAAATGACTATTGGATATCATCCATTCTTAGTTATTCTTCTCATTTATTCG
 GGTATGGTTTCTGCTTATCAATCAAAATTTCCAGTGATTCTTTTAGCCATTACTATCTTCTCAATCTCATCACTTCACTT

406

TTTGAAGATTCTCTTTTGAAGTGAATTGTGCTTAAGTGTCTTCACTATTAATACTATTTAGAAATAAGCTAATTGGATCAGTGG
CTTAAATAATAGCTGACTGTGTGTACATATGTATATAATATGTATATACAATATCAGGCATGCATGTGGCTTGGAAATTTTGTCTCC
TCCATAAAATGTGGAAGTGAATTAAACAAGTTTGTAGTCATTTATACAAAGTCACAAATATAAAGTTCAGTTTGTACAAAGATTAAA
TTGCTCACAAAGTAAATTTGATTGTTTGGCAAAATCACAAAGTAACAATCCTGTGAGTTTCTATTATGAAGTTTAAATAAATG
5 GGCTCATTAGTTGCTGGGCACCTATTACAAATTCATTGTGTCAGCTCTTTTGTAGTTCTTTAAAAAATAAATCATATGAT
CATTTTCTTTTGGGGTACTAGCTTCCATGCCTATAAAGTCTGGTACCAGACTGACTTGAAATTCATAAACAGTTGTGCCAAT
TGCCAAAGTAATGTTAAACAATTAAGTTCCAACTAAAGCCAGTAGCACCAAGTCTTCATAAGAAATACAAAGTATACATACAGTA
TTGCTTACCTGGAGGATTAGATCATTAGGAATTCCTTTGTATGAAAGATCAGTCCCATTTGAGTTCTCTTGCAGTGTGATTT
TAGTGATATAGAACTAGCTTGTAGTTAGTGTTCATTACATTATAAAGAAATAGTTTACACACGTAATTCAGTTTCCAAATTTA
10 AACTCAGAAATACCAAGCAGGCTGCTTAAGCCCACTACCTGGCATATAAATTTAGTAACACTTTGTACTTTCTTTTAAAT
AGGACAGCATGAGTTAGGACAAACTCTAAAAATTCATTTCTTCACTATTCTTGTCTTCTTGTGATTATAGACCAAGATGG
TGTACTCTAATTTTTTAAACAGTAATGGAACACAATTTTTTCACTCTCTCTCTCCATTCGAAGTAAAGATCCCCAGTTAGT
TTTTATATAAATACTATAGGGATTCAAAGGTGTACAGTCCACTTAATTAGTCAAATTAGCAATGGCTAAACAGTATCAAGTA
CTGCAGAAATTTACTGAAATGGATAAGAGGAAATAGTTTGTACAGGTTTTCAGTCCAGCAAGGCCAAAGAGGTATAGTA
15 TACAGTTAATAGTATTGTGTTGAGCAACATGGGGCTAGTGGGATCACAGAAATCTGGAAAAAATAAAGGCTTTGGCTTAT
CAAGCCTAGTGTAATTTCTGCATCTCACAGACTTTAGTTTGGCCAGGTATTATCTGCCAAAAACAGGACAAATCTTGTGTAT
TAACAGCAGGTCCTCTCATTTCTTGTGCTGACTTACCTTTTACTGACCGTTGTGAATTTCTGTCTCAAAATGTATATAG
AAATGCAAGAAAAAACAATGTACAGATTGTAAAGTTTTTGTATACCTAATGTAAAGTTTTCTTGTGTAATTTTATATGATAAA
AGACATTAGGATCCCTACAAACAAATGTCTTGTGTTCTTCTGTCTGTCGACCCCGTAAACACTTACCTGAAATTTTCCATAT
20 TCCACAGTAAGACCACTGCCCCTATTCTAATTAATCAAATGAGTTTCTGGAAGGAAAGGCAAGCAGCTATTGTTTAAAAAT
TTCTACATCTTTTTACAACAGGAAGTAACACTACAGAAATATTCAATCTCTTCCATCTTATTATAAATTTACAGTGGTCCCC
AATATTAAGTCTATAAATCTTAACATTAAAGGAGACAGACTTGAGGTTGTCCCTCTCTGTGGCTTTTAAATCCACAGTTTCAT
CTAAGCAAACTAGCATGTAAAGAAAGAAATCCCTTGAAGCTATGGATAAAATTTGGTAACGACAGCTCAATCCAGGTTACAGACCTAC
25 TCAGGGCAATTTATTGTGGTCATGATTATTAGAATGATCAGACATAGCCACAATTTCCCTTAATCCCCAGCTAATTTTGTGTT
AACCACACCAATGAAGAAAGAGGAAAAATTTCACTCACTCAAATTCCTCTGTGGAATGCATTCGGAACGTTTAGATGGGGGTGTA
TTTATCATTGGGCAATTCATAACTCTCATCAAGTAATAAGTCACACTGACAGCTGATCTCGAAGGCAAGATTAACTGCC
TGCTCAGCTCCCCCAATTTTCATCCCACTTTCTTAACCTGTGCTCTTCCAGGTATAGATAGTATCACTGCTCAGGACATTT
TTCTGGTCACAAATTTTTTAGGTTGTCTGCTCTCTTGTGTCAGATACAGGTAATAAGATGTTTTTATTAAATGTTTTTC
30 CTTTTCTGTTTAAAGGCAAGGTTTCCCTGATCTGCAAAACAAAAGTAAAGTTCAAAGAAAAACCTTGTCTCCCTTTGTATGTG
GCTTTAGTATAGTGTGGTATTATGTTATAGACAGAAATACATGCTCTTATACGGTCGAGAGGAAAGTACTGCTTTAGGCA
GAAACTCCAGTAAGATCATGCTATATTGTCTATTAGGTACCAAGGCTGGCAAAAAAGAGAAAGAAAAAGGGGAAGGACATGAGG
TAATTAATAAATGAAATTGAGAACAGGCAAAAAAGAAATGAAAGGAGGTATCAAAAAAGTGTGGATTATTAGGAAGCAGTGGAG
TGCCATTCTACATCTCCATGTCGATTGCACTCAATTTTAAACATTTTCACTATGGCTTTCCCATTAAGGCCCAAAATTT
35 CTTCTGCTATTCCAGATACTGCTCAGCAAACTGTTCTACAAAGAAATTTTTACTGAACAAAGATTATCAGGAAATCCACCT
TACAGGAAGAGTAAATATTAAGAGTCTACCTGATTGAGCTTTTCAATTAAGGTTTATAGGAATGTGTACATAGGAGTGGT
TTCACTGCTCAACACGATTCCAGGAGCAAGTGCTAACTTTGATAGGAAATAGTGATTGTAGTGAATAACCAAGCAGCTCCTA
TAAAGGTACAAAGAAATCTTATGGAATCTAATGAACTGTATAAATATTGTTTCTGCCATATTACCAATAACCTTTAGTGTA
AAAAAGTTGAAAGTATTGTAATCTCCTTCATCAGCACTAATGCTACCAAAAAAGAGTGGGAGGAAATGAAAGGTTTAA
40 GAAGATTTTTAAACAACTCTGAAATATTCTCAAGTAGTTTCTTAAAGTTTAAAGTTTAAAGTTTAAAGTTTAAAGTTTAAAG
CTACTGATAAAGGTTATTTCTTAATTTATGGAAGGCTTTTTTTCAGCTATCACAAATGAAATTACATCTTTTCAATTAATATAAC
ACACGAAAAATTAATTTTCAAAATAACCAAAAAATTTATATTTTCTACCTTGAACACATTTCTTCAAGGGTTAGCTTGAATAAT
ACATGTTTAAAGTATACAGAAATTTCAATAGTTACTTTTAGGTTTAAACATTATTAGATTATACCAAGGTTTACCAAAAAA
TAACAACAAAAAACCTGCTAAACATCAATACCCTGTGCTGCTGGGAACAATTCAGCTTTCTATCAGTTGAGTTGGTTAGATCA
45 CATTAAGTTGTTATGTATAGGTATTGACAGAAAGCTTACATAGATACAGATTTTACACTAAGATTGAAAAAATTTATGGTACCA
GCTCTTTTCTCTTAATTTCTACACTAAGAGAAAAATACATTACTTGGCTACATCTTAAAGCATTCAAAATAGGCCCTCTGTAA
GTTTTTAAACAAATTTGATTGTTTATTTAGGTTTAAAGAAACCTGAGATGAGTGAAGTGTCTCATTCTCTTGTACAAATGA
GGACAAATCACTCTTGAGAACTAAGGTCATTTCAATCCATAGCACCCCTGACCTAGTGCCATGATTCAAATCACAACTCTGAT
50 AGCTAAGACTTTGACTGCTCAACTAGCAAAATCACATATAGCCATCCCTAATTTGTGTTTCCCAATCTAGCTGTGAATCAGAA
TTACCAAGGATGCTTAGCCCTACCTTGATCTACTGAAGCAGAAATTTAGCTCTTAATTTCTGTGATACAGGTCAGCTGCC
TTTTAATATTGGATATCTAAAGTGAGAGCATAAATGATGAAGAGACAGTTTATAGGACTATTCTCACACCGTCATGTAAGTT
GGTATGTGTTCTTGTCCATTAAAGTATTCTGACCTCAATCTTAACTTTGCTTTGTCAAAACAAATCATGTGATTCAAATCC
AATTAGGATAAAGTATGTACAGTAAAAAGTAACTTGGGCTCAATTAATGAAACTTAAACAGAAATCTGGCTAGAGAGGAAAT
55 CCTCTATAAGAGAAAAATGATTACAACAACTGCTACTAATAACAAGTGAAGTGCCTTTCCCTATTGTAATCGAATG
AAAAACCCACAAACACATCCACAGCAATACAGGTGAGGCAAGGCTATATTCTTCTATTACAGGTGGGGTCTTTTATATGTC
TCAAACTGAACAAATACAGGTAACAATCTAAATCAATCATGACATAAATACTTTCCATTTCGAAGTCTGATGGTAATAA
TATTACATTTTAAAAATAATTTTGTCTTTTTTTGTTTTTAAAAAGACACAACATGCTCAAGGGTACACAGAAATATGGA
AAGTCACTACTTTTGTAGAGATCACTGGTAATAAAAAACAATGTTCTTACATTAACCAATTAAGAGTGGTATCACCAGGG
60 AGTCTAACATGGTGTACTTCAAGATGATATTCAAGTAGTTATTGGAACACTATTCTAATGTATCTAAGAAGCAAGCA
CTGCTATCTAATTTTATAGTTTGTATCTCTATATTCCACCTCCTCCACCACCACCACCACCACCACCCTCCTCCAT
ATGGATCTCCTAGCTCTTCCACCTAGCCCCCTCTCCACCTAACCCTCTCTCCACCTAATCTCCCTGCTTGGAAACCT
CCTCTACANNN
NN
65 TCTCTTTGCAAGGGGCATTCTGAGGTTGGTGTCAATTTCAATCGGCCGCTCCCTGTGAGGACCTTCCCATCAGCA
CCTGTGTGAAGAAACATTTCTTTAGTTCTTAATTTTCAAAAAAGTTTACATAAAGTTTCAAGTGTGTTGTTCTTAATAAC
AGAAGCCATATTAAAGCATGAAGTACAGACTGAGCAACAAATTAATTAATAAATTAAGTGTGGAAGGATAAGGAGA
AATCTGTTAAAGGATACAAATCACGCTAGACAGAAATTAATTTCTAGTGTCTATACCATTTGATGATGACTGTAGTTAATA
CTAGTTTCAATAGCTACAAGGAGGATATTGAATGTTTCCAACAAAGAGATGATAAATGTTGAGAGGGATATGCCAATCACC
70 TGTGATACATGAT
TAATTTTTTACTTCTGTTTACCAAGTCTGAAGAAAAAGAAAAATGAATGTTTAAAAAGGAAATATGAAAAATATAAAA
TGTTGATACATGACAAATCTTGTAGTATATATATATATTTTTTTTTTTTTTTTTTTTTTGTAGATGGAGTCTGCTCTGT
TGCCAGGCTGAGTGCAGTGGCATGCTCAGCTCAGTCCGAGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
CGAGTAGTTGGGACTACAGGCACCCGCCACCGCCAGCTAATTTTTTGTATTTTGTAGTGGAGACAGGTTTCAACGTGTAGCC
75 AGGATGGTCTGATCTCTGACCTCGTATCCGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
GCCTAGAATATATTTTAAACAATCTGAGAGATTTCTGAACTTAAAGGCTTAATTTTTTCTCACTTAAATTTGTGTAG
CAAATCTGTAACAAATGTAGTACCACTTCAAGAGGTTCTTTTAGGAAACATTTTATATATAACGACATACCTTACA

TTCATTAACCTTAATATCCATTATACAAATAACAACCTCTGGACTTCCATTGCCATTGATTGTTGTAATTGATTATCCAATAAAAAGAT
 TATATTCCTAAGCACATTTTCAATTTCAAAAATGTATGAAGTACATATAACATGGGACCTTAATGAGGTGAGAGATTGATATAAAAAC
 TATAATTCAGGTATCACTGCAAGAGAGAGAGAGGATTCTCAATGAAGTCTTCTTTAAGAACTTAAGCTCACTTACTTTTCAGT
 5 GATGATACAGTACCATATTTATTAAGGAGAAACACAGTTAAATATATTTCTTTACTATGCTTTATAATCTCTTCAAAAATAAAT
 AGGGAAGAGTTTAAAGTATCCAACTTCTATAAAAAGTAGCAGCTTTATATGCCATGAGCAGAGGAAAGATAGCAATTAAGAGGGTG
 TCATCTGCTCACCACAGACAAGGGAAGCAATAGCTTCTGCTACTGCTTTTCAGGAAAGAAAGTAAAAAGCAACTGCCTCAAC
 CAAAATGACCAATTAATTTATACACTTCCATTGATCTCTCAATCAAAACCAAGTTAGGATTATGTCACAAAATGAAATATAAAAAG
 TGCAATATCCTCAAAGTGAGACAAGGTTCTAAGTATGCAACATTCTTTAAAGATGGCAATGATGCTCACTACCAAAATCCAAAA
 10 AACAGCCTTTCTTGGTTATTATTTCTCACTGGTCTCTCTACCAACATGGTATGTTGGTGGGCATATGGAGATGCCAGAACTGATCA
 TAAGACTACCTCAAATAATGAGACCAATAAATATATAAATCAGAAGAGATGGCCAATGTTACTTACAGAAATAGAACTCTTGATCC
 AGCAAGACTAAATATCACCAATGCAAGATGTTAGGTAAATATATTTAAAGAGAGAACACTTTCAGAACATAGGATTGAGCCACAG
 TGAAGACACAGAGGCAAACTCTGGTATGCTTAAGTATGCAATAGTTAGCAAAATGACTTTAAAAACAACTCCCTCTGAAAAGG
 TATTTTATCTCAAGTTACACTGAGTGAGAAGCGATGCTTTAAATTTATCCAAATCCCTTATTTCTGATTTTTCTGCTTTTGTGTAAT
 15 AAAGTTTGCCATGGAGTGCTCTACCTAAATGAAGAGGACATGCCAGTTAAGCTGACATAAACATACTAAATACTTTATTGTTATT
 GCTGTTGTAAGTGAAAAATTCAGACTCCTTGAGCTGTTTAAATAGACTACTGTGAGAGAAATGGATGTATCTCCAAATCAGGA
 AACAGAAGCTCAAAGAAGTTCAGTAGCTTGCTCAGGTCATTCTGTAAGTAAATGACAGAGCCAGGATGGGAACCCAGATTTGGTC
 TGACTCTAAAGCAGAACTCTTCTCCCTTTACCAAGGATATAACGAATCTGTGACTTTGAAACAAATCCGAAAGATTCTTA
 CTGACAAAAATGATTACTTTTAGAAGATGGAACATAATCTTGCTAAAGCTTTGACAAAAACAATTCATAATCTCTTAATTC
 20 AGCAAAATACCTTTGATTATGAATACAAAAATCAAGTGAACATACACATACAAAAATAACATACTAAGCCTAGACTGAACC
 CCGCTGCCACTCTTTTCTAAACATTTACCAAGGACATGAAGAAAAATAGACTAAAAATCTGTA AAAACATTAAAGTAAGATATCAT
 CAATTCATTTTCCACTGTACTGAAAGAAACCAACCTTATTAATGGCAGATGCGGTCTTCTCCGGCTGGTGCCACTACTTTGCTC
 TAATGATCTTGGATAGATCTTACGAGCAGCAAGTAGATGTGCCATTGTAATCGTTGCTTGGGTGACAAAGCATTAACGCTTAGGC
 TGATAAAATCTTGCTATATCATCTGTTTACCTAAATGACAAGAGTTAAGGAAAAAAGGAACAAAGTACATTTTAAATGAAAGAG
 25 CAAAAACATCATATCTTTAGAAATAAAGAAAAGGAGATAATGCATAAGCAAGGAGTTAGAAAAAGAGCAAAACACCCAAATATC
 TGAGAAATTTATGAATAATTTAGAACAAATAAATAGACCAACAGGTGTTAAAAATATGTAATACCAGCAACCACTCGCTAAAAAA
 TAATAACAAAAAATTTCTATACATATTAACCAAAAAATACCTAAAAAATAGTTTAAACAAACCATACAGAAATTTAAAGGG
 AAACATCAGTAAATCTTGCAAAAAAAGGAAAACTTGATAAATGGTAAGAAATACCAAGTTTCTGTATGGGAACATTAAGTAT
 TATGTGCAAGTTTCCCCCAATTAACCTTATAATCTTATATAAATAGTTTGTAGAGAAATGAAAAAATCTAAAGTTAAATCTCAG
 30 AAATCTAATGTGAAGAATAACTAAAGCAATTTGAAATATAATCTTACCAAACTAATAATGTCTATAATACAAATTTATCATCAT
 CTTATCAGTTAAACATTTAATGAGAACTTATTAATGTGCCAGGATGCTGTTCACTTAGTAAGGCATTATTTCTTTAATCTCAAAA
 TATCCTTTTAGAGAGGTTGGTTTATTTATCCCTTTTGAGATGGAAAAAATAAGGAGCATAGAAAGCTTAAGTTAGTTTCCC
 CAAAATATAGAGAGAACTCTAGCTCTGCCACTTAGCAACAAGGCTCTACCTGACCCCAAGCACAGGCTCTAGTATAGATAACAGT
 TTGCTATCTCAGCTCCATCTAATTAAGTAACTGAGAACTTGAGAGAAAAAACAATAGATTGATGAAATAGTATATGAGACTCAGAGCTC
 35 ATAAATCTATGAATGCAATAATGATAAAGGAGACATCAAGATCAACGAGAAAAAGGAAAGGATTATCTTTAAATGGTGCTGGAA
 TGACCTGGTGCTATCTGTAATAACAATAATACAGCACACCATATAACAAGGGAATTCCAAAGAGAACAAAAAGTTAACTGT
 TTGAGGTTCTGATTCTCAATTTAAAAACAACCTACATTTAAAAATTTAAATTTCTGACTTTAAAGATATAAAACAACATCTAATG
 ACAACTGGGAAAAATATTTTCAACAAATAATTCACACAGCAACTCTCTTCTATATAAAACCTCAACACAAAAAGAAAAACAGA
 ATTCTACAGGAAAAAATGACAAGACATAATAGAAGTTAAAAAGAGGAAATTCAAATGACTAATAAGCTTATGAAAACAGTTT
 40 AACTTTGCTCAATAATAAGAACAGACAAAAACAAGTTAGTCTTTTAACTCAAGTTAGCAATAAAGAGGGCTAAAGTGACACAACTT
 TCATTTACCTTACTGGAAGGAGTTTAAATTCATATAAA

HUMAN SEQUENCE - mRNA

CCCGGGGGGGAGAGAGCCGGCAGGCGGCGGGTGGTGGCGGGGGCGATGCGCCGCGCCCGGCGCGCTAGGTGAGCCGGCACCGG
 GAGCGCGGGCGCGGCCATGGGCACCTGGGCAAGGCGAGAGAGGCTCCGCGGAAACCTTCCCATGGCTGACAGAGCTGCCTCTTAA
 45 GCAAGAGTTAGAGCAAAGCCAGCCCAACAGCCCTCCCTCCCATCCAGCTTGCGCCACATCACCAGTTCCGAATGATGGTGT
 TCTGGGACATTTAGCCAAAGGAGCCAGCTGGACGATCTCATTGACAGCTGCATTCAATCTTTGATGCAGATGGAACCTGTGTG
 GAAGTAACCAACTGTTGCAAGTATGCTGACCATGACCGAATGTGATCTCTCTGAGAACTGCTCCAAAAAGTTATCACCTC
 TATAAGGATGCTTTGGCAAAGAACTTCCAGGACTTTGCTGAGATCTGTTATTTGTAAGGTATTGGATAACAGAACTTCTGGT
 50 CATGTTTAAATGGAGCGCCAGCTTGACAGACACTATGAGGAGTTTCAGGAACTGGTGAAAGCTAAGGGTGAGGAGTTTACATTGCC
 GCCTGATTGACACAACTCAAATCAATGCCCGTACTGGTCCAGGAACTTACTCAAAGGATAAAATCAAATACCAGCAAGAAACGG
 AAAGTCTCCCTGCTCTTTGACCATCTGGAACCAAGAGAGCTATCCGAGCACCTCACCTACCTTGAGTTCAAGTCTTTCCGGAGGAT
 ATCGTCTCTGATTATCAGAAATACCTTGTAATAGCTGTGTGAAGGAAACCCACCATGGAGCGATCATTTGCTCTGTGCAACG
 55 GCATCTCCAGTGGGTACAATGATGGTTCTCAGCCGCCACGCGCGAGCTCCGAGCAGAACTTTCATCAAGTTTCATCCAGGTG
 GCTCAGAAGCTCCACCAACTACAGAACTTCAATACACTGATGGCTGTGATAGGTGGGCTGTGTACAGCTCAATCTCGAGGCTCAA
 GGAGACAAGTTTCGATGTCCACATGAAATCAATAAGGTTCTCGGTGAGATGACTGAGCTGCTGCTCCTCCAGAACTACAGACA
 ATTACCGCGAGCCTATGGAGAGTGACCGACTTCAAGATCCCAATCTGCGGTGTGATCTCAAGGACCTCATCTCCCTGTATGAA
 GCAATGGCTGACTATCTGGGGACGGGAAAGTGAACGTCCATAAGCTACTGGCCCTATACATATCAGTGAATTTGGTCCAGCT
 60 GCAAGAGGTGGCCCCACCCTTGGAGGCTAACAGGACTTGGTACACTTGTGACGTTATCCCTGGATCTTTACTACACTGAGGATG
 AAATCTATGAGCTTCTATGCCCCGGAACCAAGGAACCAAGAGCTCCACCACTAACACCTTCAAAGCCACCAGTAGTAGTGGAC
 TGGGCTTCTGGAGTGTCTCCAAACCTGATCCAAAAACATTAGCAAAACGCTCCAGAGGATGGTGGATTCTGTCTTCAAGAACTA
 TGATCAGCAGCCAGGATGGATACATTTCTCAGGAAGAAATTTGAAAAGATTGCTGCGAGTTTCCATTCTTCTGTGTGATGGACA
 65 AAGACAGGGAAGGCTCATCAGCAGGATGAGATCACAGCCTACTTTCATGAGAGCCAGCTCAATCTATTCCAAGCTGGGCTGGGC
 TTTCTCACACTTCCAAGAGACCACTACCTGAAGCCCACTTTTGTGACAACTGTGCTGGATTCTCTGGGGAGTGATCAAAACA
 AGGATATCGATGAAGACTGCGGGATGAACCTGTCAAAACATGCAAGAGATCTGGTGTGTTGAGTGAAGAGCCGAGCCAGA
 ACCAGTAGCTCCACAGAGAAACACTTCTGTGGGGCAGTGTCCAACTTTGCTCATTGGGAGCCAAAGATCTGTCTTGTGCA
 CCTGAGGAAGGACCTTTTACATTCCTAATGGGGAGGCTGTGGAACATGGTGAGGAGATAGGATCGGACCATCATGCTGATGGG
 70 AGTGTCTCAGAGAAATTTCTCTCGCTGAAGAGGGCTGTGCCCACAAGGCCACCCAGACTGAATCACAGCCTTGGATTGGCA
 GTGAGGGCCCTTCAAGTCCCTTGTGCTGTCTTCCCAAGGAAGACAGCCAGGATACTTATATGTGCTCTCCAGTCCCACTCT
 CCATGTCTAGCCAGTCTTGTGTCAGAAAGCGGGCTTTGTCAAGTGGGAGAAAGAACTCCCTCATAAAAATCAAAGGAGGAGCT
 CCGTCACTCAGACTGCCTACCTACCAAGAACTGGAACAGGAAATAAATACTCTGAAGCAGATAATGATGCCCTAAAGATCCAA
 75 TGAATAATGCAAGAGAAATAAGAACTCCCTCAGCTTGAAAAAGCAATCATGTCTTAGCTCAAATGGAGCAGGGTGACTGTTCT
 TAGCCAGAACTAAGTAGCACAATCTGTAGATGAGTATAGTGTCTCATTCTCTAACTGTAATGCACAGACCTGAGGAACTTTA
 CACTGACCGACTTTAAACAGTACTTTAAAGGAAAGCTGTTACTGTTTATTACCTAAAGATTCTAATGTGCAGCAGCTGTT
 TTCTCTTTCAGTTAGTTGACTCAAAGGGGGAACATAAGAAATGCAAACTTTTGTCTATTACACCACTGATTCATCAAAAGTA
 TCGGATCTAAACATGACTATCATTTCTGACAAATGGGCACTCTCGGTGGCTGCTGGCTGATTCTTCTTAAACTAAAACTC

5 TGGAAAAATGGATTGCTTCTTACCTGTGTTTTCTGCAAAGTACTTACTTTGTTCCAGCCAAAGCTTGCTAATAATAGAAAACTA
CCCATATTCCAAAGTAGATTTCCTCTGTATCCAGCATACTTTGTGAACCTGGCTCCTTCTTCACTACCTCAGATCTAATCAATT
AGTCCATGTACCCCTCCTCTCTCACTACAGTCATAACATGAGCATATCTACCTAGAAGCCAATTTCTACTGTGTAGCCAACT
10 TTTTAGAGGCCCTATTAAACATGACGTTATCCAAATGTCAGGTCAACTTATAGTTGTAGCCTTACAACTTACAGGCATCAGAAAAATAA
GTAATCAAATTAGGTACCTGGAACATAGCTATTACCATCTCATATTACTGTCTAATTAATAAATAACATAACGCAAAACATGTTTGT
CCTTATATATTCTACAGTGGATAGAATTAGGAATTGATGGCTTAAAAAAAAGTCTATGAAGAGTCTGTTTAACTCTTCAATGTTT
CATCTTTCTCTTCTGAAGTAAACTATTTTGAAGTTCTCTTTTGAATGAATTTGTGCTTAACTGTCTTCACTATTAATACTATT
TAGAATAAGCTAATTGGATCAGTGGCTTAAATAATAGCTGACTGTGTGTACATATGTATATAATATGTATATACAATATCAGGCA
15 TGCAATGTGGCTTGGAAATTTGTTTCCCTCCATAAAATGTGGAAGTGAATTAACAAGTTTGTAGTCATTATACAAAGTCACAAATAT
AAAGTTCAAGTTTGTACAAAGATTAAATTGCTCACAAGGTAAATTTGATTGTTTGGCAAAATCACAAGTAAACATCTGTGAGTTT
TCTATTATGAAGGTTAATAATAATGGGCTCATTAGTTGCTGGGCACCTATTACAAATTCATTGTGACGCTCTTTTAGTTTCT
TCTTAAAAAATAAATCATATGATCATTTTCTTTTGGGGGTACTTAGCTTCCATGCTTATAAAGTCTGGTACCAGACTGACT
TGAAATTCATAAACAAGTTGTCCAATTGCCAAGATATGTTAAACAATTAAGTTCCAACTAAAGCCATAGCACCAGTCTTCA
20 TAAGAAATACAAAGTATACATACAGTATTGCTTACCTGGAGGATTCAGATCATTTAGGAATTCTCTTGTGAAAGATCAGTTCCCA
TTTGAGTTCTCTCTGCACTGAGTTTATGTATATAGAATAGCTTGTAGTTAGTGTTCATTACATTATAAAGAAATAGTTTACAC
CACGTATTTACCGTTTTCCTCAATTTAACTCAGAAATACCCAAAGCAGGCTGCTTAAAGCCACTACCTGGCATATAAATCTATAG
TAACACTTTGTTACTTTCTTTTAAAGGACAAAGCATGAGTTAGGACAAACTCTAAATTCATATTCTTCACTATTCTTGTGTTTCT
CTTTGATTGATATAGACCAAGATGTTGTTACTCTAATTTTAAACAGTAAATGGAACACAATTTTTCATTCTTCTCTCTCTCC
ATTGCAAGTAAAGATCCCGAGTTAGTTTATATATAAATAATCTATAGGATTCAAAAGGTGTACAGTCCACTTAATTAGTCAAAAT
25 TAGCAATGGCTAAACAGTATCAAGTACTGCAGAAATTTATCACTGAAATGGATAAGAGGAAATAGTTTAGTCAGAGTTTATACAGT
CCAGCAAGGGCCAAAGAGGTATAGTATACAAGTTAATAGTATTGTGTGAGCAACATGGGGCTAGTGGGATCAGAGAAATCTGGA
AAAAAATAAAGGCTTTGGCTTATCAGGCTAGTGTAAATTTCTGCATCTCACAGACTTAGTTTGGCCAGGTATTATCTG
CCAAACACAGGACAAATCTGTTGTTAATTAACAGCAGGTCACCTCTATTCTTTCTGCTGACTTACCTTTTACTGACCGTTGTGA
ATTTCTGTCTCAAAATGTATAATATAGAAATGCAAGAAAAAACAATGTACAGATTGTAAAGTTTCTTGATACCTAATGTAAAGTT
30 TTCTTTGTGTAATTTTATATGATAAAGACATTAGGATCCCTACAAAAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
AA

HUMAN SEQUENCE - CODING

30 ATGGGCACCCTGGGCAAGGAGAGAGGCTCCGCGGAAACCTTCCCATGGCTGCAGAGCTGCCTCTAAAGCAAGACTAGAGGCCAAA
GCCAGCCAAACAGCCCTTCCCTCCCATCCAGCTTGGCCACATCAGGCTTCCGAATGATGGTGTCTCTGGGACATTAGCCA
AAGGAGCCAGCTGGACGATCTCATTGACAGCTGCATTCAATCTTTGATGAGATGGAACCTGTGTGGAAGTAACCACTGTTG
CAAGTCATGCTGACCATGCACCGAATTGTCTCTCTGTCGAACTGCTCCAAAAGTTATCACCCTCTATAAGGATGCTTTGGC
AAAGAAATTCACAGGACTTGGCTGAAGATCTGTTATTTGTAAGGTATTGGATAACAGAAATCTGGGTCTGTTTAAATGGACG
35 CCAGCTTGACAGACACTATGGAGGAGTTTTCAGGAATGTTGAAGCTAAGGGTGAGGAGTTACATTGCCGCTGATTGACACAAT
CAATCAATGCCGCTGACTGGTCCAGGAACTTACTCAAGGATAAATCAATACCAGCAAGAAACGGAAAGTCTCCCTGCTCTT
TGACCATCTGGAACAGAAAGAGCTATCCGAGCACCTCACCTACCTTGAGTTCAAGTCTTCCGGAGGATATCGTTCTCTGATTATC
AGAATTACCTTGTAAATAGCTGTGTGAAGGAAACCCACCATGGAGCGATCTATTGCTCTGTGCAACGGCATCTCCAGTGGGTA
CAACTGATGGTTCTCAGCCGCCACGCGCAGCTCCGAGCAGAACTCTCATCAAGTTTCATCCAGGTGGCTCAGAGCTCCACCA
40 ACTACAGAACTTCAATACACTGATGGCTGTGATAGGTGGGCTGTGTACAGCTCAATCTCGAGGCTCAAGGAGACAAAGTTGCGATG
TCCACATGAATCAATAAGGTTCTCGGTGAGATGACTGAGCTGTCTCTCTCCAGAACTACGACAATTACCGCGAGGCTAT
GGAGAGTGACCGACTTCAAGATCCCATCTCTGGGTGTGATCTCAAGGACCTCATCTCCCTGTATGAAGCCATGCTGACTATCT
GGGGGACGGGAAAGTGAACGTCCATAAGCTACTGGCCCTATACAATCATATCAGTGAATTTGGTCCAGCTGCAAGAGGTGGCCAC
CCTTGGAGGCTAACAAGGACTTGGTACACTGTGCTGAGCTTATCCCTGGATCTTTACTACACTGAGGATGAAATCTATGAGCTTTCC
TATCCCCGGGAACCAAGGAACACAGAGCTCCACCACTAACACCTTCAAAGCCACCACTAGTAGTGGAGTGGGCTTCTGGAGTGTCT
45 TCCCAACCTGATCCAAAACATTAGCAACACGCTCCAGAGGATGGTGGATTCTGTCTTCAAGAACTATGATCAGCAGCAGGATG
GATACATTTCTCAGGAAGAAATTGAAAAGATTGCTGCGAGTTTCCATTTTCTTCTGTGTGATGGACAAAGACAGGGAAGGCTC
ATCAGCAGGATGAGATCAGCAGCTTCTCATGAGAGCCAGCTCAATCTATTCCAAGCTGGGCTGGGCTTCTCTCAAACTTCCA
AGAGACCACCTACCTGAAGCCCACTTTTGTGACAACCTGTGCTGGATTCTCTGGGGAGTGATCAAAACAGGATATCGATGTAAAG
50 ACTGCGGGATGAATGTCAAAACAAATGCAAGATCTGGTTGTGTTGAGTGTAAAGAGCGAGCCAAAGAACCCAGTAGCTCCCA
GAGAACAACACTTCTGTGGGGCAGTGTCCAACCTTTGCTCATTGGGAGCCAAAGATCTGCTCCATGCACCTGAGGAAGGACCTTT
TACATTCCTTAATGGGGAGGCTGTGGAACATGGTGAGGAGTAAGGATCGGACCATCATGCTGATGGGAGTGTCTCAGAGAAGA
TTTCTCTCGGCTGAAGAGGGCTGTGCCCCACAAGGCCACCCAGACTGAATCAGAGCCTTGATTGGCAGTGAGGGCCCTTCAAGT
CCCTTTGTGCTGTCTTCCCAAGGAAGACAGCCAGGATACTCTATATGTGCTTCCAGTCCCACTCTCCATGTCTAGCCAGT
CTTGGTCAGAAAGCGGGCTTTGTCAAGTGGGAGAATAAGACTCCCTCATAAAATCAAAGGAGGAGTCCGTCACCTCAGACTGC
55 CTACCTACCAAGACTGGAACAGGAAATAAATACTCTGAAAGCAGATAATGATGCCCTAAAGATCCAACTGAAATATGCACAGAAG
AAATAGAAATCCCTCCAGCTTGAAGAAAGCAATCATGTCTTAGCTCAAATGGAGCAGGGTACTGTTCTTAG

MOUSE NOMENCLATURE
ICSGNM Nmyc1
Celera mCG19753

HUMAN NOMENCLATURE
HGNC MYCN
Celera hCG1783900

[illegible]

411

GTGGATTAGAGCTTTATAATTGAGATCTGATCTCTGCCTAGATGAAAACTGCTTACTCCGTACAACGCATGTTCCGACCAGGAAAA
 GGTGTGTGTCGTAGTGAATGAGATTGTCTAGAGTTTTAAGGATGGCAGAAATCAAACCCAGCCATGGGTTTTACCAAAGGAGGAGC
 CTCGGTCTGAAGGGGGCTGTGGAAGTGTGTATAAGTAAATCCATGGGGCAGACTGGCTGGTATTATGCTAAAGGCCCTATTA
 5 CCGAGCATCTGTCGCGCAAGTCTACATAGTGTCTGCCAACTCAAACACTGTGGTTATTACCCCATTTGAATCTGAGGACCTGA
 AGAGTTTTTCCAGGATCATGCCGACAACGGCTCGTTCTGACTCCAGTTGGGTTCTCGAGTTTCTGCCACATCTCTCAAGTTTGTCA
 CCAGGGGTGAATCCTGGGCCCTTCCACATCAGACAAGTGCCTGTGGCCCCACACCACCAGGGAAGGAAAGGGGTGGGCGTA
 CCTCTGTGTCGCGTGTGATCAGCAAACTAGCTGACTTAAATAACAAGTGTATGTTAATCGCACAATTAACCCAGAACTATTTTT
 CCCCTCAGATGATGAGGATGACGAGGAGGAAGTGAAGAGGAGGAAATCGATGTGGTCACCGTAGAGAAGAGAGCTTCTCTCTA
 10 ACAACAGGCGGTAAACCACTTTCACGATCACTGTGCGTCCCAAGACCTCCGCTCTGGGTCTGGGGCGAGCAGACCTGGCGAGCTG
 ATCTCTCAAGCGCTGTGTTCCCATCCATCAGCAGCACAACTATGCTGCACCTCACCTACGTGGAGAGCGAGGACGCGCCCCGCA
 GAAAAAGATCAAGAGCGAGGCTTCTCCACGCCCCCTCAAAGTGTGTTCCAGCAAAAGCGAAGAGCCTGAGCCCCGAACTCAG
 ACTCGGAGGACAGCGAGCGCGCGCAACCAACATCTGGAGCGTCAGCGCGGAACGACCTCGCTCCAGCTTCTGACGCTC
 AGGGACCATGTGCTGAGCTGGTGAAGAACGAGAAGCGCGCAAGGTGGTCATCTGAAAAAGGCCACCGAGTACGTGCACGCCCT
 15 ACAGGCCAAGCAGCAGCAGCTCTGCTGGAAAAGGAGAACTGCAGCGAGGCGAGCAGCAGTGTCTAAAGAAGATCGAACACGCTC
 GGACTTGTCTAAAGCTTCCACACGGACAGTCACTGCCACTTTGACATTTTGAATTTTTTTTTTAAACAAACATTTGTGTGA
 CATTAGAATGTGGTTTACTTTCAAATTGGTCCCTGTCGAGTCTGGATCTGGGTAGGGGCGAGGACACGGGGTCTGCCATGAC
 CTTGGAAAAAATACTGACTTATGGGATGCTGGGTGGCTTGTTCCTCTCCATATCACCTGGTGACAGCTGGGAAGTCTGGGAC
 ACTAAGGAGCTTCAGGAGGCTGTGAAGTCACTTGTTCGGTCCAAGATTCCAACAGAGTCATTCTTCTTTTCAATAGGTGCT
 20 TAAGTTCACGCAATGCCACAGAAGGGGGGGTGGCATTGTATGCCCTGGGAACACTTGTGTAATACCATTTGATACACCCGCT
 TTTGTATAGCTCTGGTAAATGAGAGGTGGCTCTTGGCGCCAGTATTAGACTGGAAGTTCAACCTAAGTACTGTAAGAACTACT
 CAATGTTTGGAGGGCATGTTTGTATACAAATATATTGTTAATCTGTTATGTACTGTACTAATCTACACGGCTGTATACCTTA
 GTATGACGCTGATACATAACTAAATTTGATACCTATATTTTCGTATGAAAAATGAGTTGTGGAAGTTTGTAGTAGATATTACTTTAT
 CACTTTTTTGAACATAAGAACTTTTGTAAAGAAATTTACTATATATATATATCTTTTCTTCTAGCTGTTTCTCTGTTTCTA
 25 CTGTAATTGTTTATGTTTGGTGCATAGAAGTGGTAAAATGGCAAAGTCTGTGTTTAAATTTCTTCAAATGTATATATTAGTGC
 TGCACTTAGAGCACTTTGAATACTCATGTTTATGAAAATAATAGCAATTAATGATGCAAGGCGAGTGTTCCTCTCTAGCT
 TGGCTGCAGTCTCTGCACACAGTCCATTCTTACCAGGACTTTTAACTTTGGAATCCTGGTTAGGAGGATGCTTCTGAGGGA
 TAAATGGGTTTGTGAATTCACAGATTAGAACCACTACTTTCAATAGGCAATCAATGGGTGTTAAAGCTCTTCAAATATTTGT
 TTTGGGTGTGAGTGTGCCCAATGTACATCCCTGCAACTGGAGTTCAAGTCTAGGAACAGGCGAGGCGCTCGCAGCACTGA
 30 ACAAGTGACTCACCCCTGAGCCATCTGTACCCCTTCACTTTTGGAGCTCTTTGGGTCTCTAGCTGGGATTAAGGTGTCGCC
 CCATATCTAGTTACCAAAACACTTTACATCTCGAATCTCAAAGCATTTTAGATAGTGTAGATACAGCCCAAAGTTTGGAAAT
 AAGCAGTAAATTTGGCAAGTTGTGCCGAAATTTACATAAACACTTGTCTAGTTGTTTGGAAAGACTTGTCTCTGAAGATTCCCC
 AGGAAGAGCTAGGTGTGGAAGCATATCTGATGCTGCAGAGGTGACAAGAAAAATGTCACCTAGCCCTCTAGCACAGCAAGCTT
 ATATTGCAAGCCCAAGGCGCAGAGTAACTTAGTCCAAAAGAAATCTAGGACCATATAATTTCTGAGTACAGGACTTCTATTTT
 AATAAGAGGATGGAGTCACTGTTTATGATCTCGGTCAACAGCTCAGCTCCAGTTCACAGAGTACTGAAGACCAAGAGGGG
 35 AAGGAGAGCTGCTATTGGGTGGAGTGTGGGGGTGCTCAAGGAAGAAATGAGCTACAGACCTTGGAGAAGGCGCAACTAAACATGA
 AGGAGGCTTCCCTCTATCTACTCAGGGAATAATTTCTGGAAGTCTGAAGACCATCTACCTTACTTAAGAACAGGACTTCTATTTT
 CTTTGGGTAAACAGACTACACACAGCATTTCCCTATGGTTTCTTCTAGTGGGTTTAACTTCAAGTTGAAAAAATAATGTCT
 TCAATGGAATAATGACGCCAAGGGTCCAGACAGCTTTGCTGTGTGGCTGTACTGTGAGGACAGAGATCAGGCTGCGCAGGTGGT
 40 TGGCCAGACAGGTAGAAGGTGAGCCATGGAGGCTCTTATTTGGGGTGACAGCTACAGATGCTGTCTTAACAGTTGCTGTGGGTG
 GTGGTACTGCTGCATTCTCTGGTGAATTTGACAAAGGTTGGAAGTGGGCAAAATGCCCTTTACAAATCTTAACTCCCCAGTC
 CCAACTATGCAAAATTAAGCCACTCTGAAGGTCCCATTCAAAAGAACTCATCTGTGTCATCTGCAAGTCTACGTAACAAGGCC
 ATCACTATGACATCTAGAAACCAAAATGGAACCTTAAAGATCTCAGGTTAATTGAGCACCTAAGAGTGTGTAAGGCTGCGCCGA
 45 GTCAACTGAATTGCTCTGTTTCTTCTCCAAAGGGGACCTGAAGTGTGACAGATGAGCTAGAATCTACTGTGTAAGAAGAAAT
 AGAACAGAGACCACTGAACTGAAATTTCTACCACTCTTATTTTGGTGACTACGGGAAACTGTAGATAATGCTCTCTTACATC
 TCCAGGACCCACTTCTGCTCGAAGCTCTGTTACTCTTTCAGATCAATCACATAACAACAACTCTCTGCTCTGGTGGAT
 CATAAATAAAGAACATATATTGCTCTTCCAGTGGATCTGAGTTCAATCCCAGCACCAAGTTAGGTGGCTAAGCTGCTGTGAAC
 50 TAAGGCACCAAGGATTTGACATCTCTAGACTCCTGTGACTTACACTCGCATAGATACACACACAATTTAAATAAATACATTTAA
 ATAAATAAATAACACTAAAACTGTTAACTTAGGTAAAGACACTTTTGTCTCTCATCTAGCTGGAGAAAGTGTCTCTA
 CTGTAACCTGCTGAGTTCTCTGTACAAATTTGGAAGAGAGAATCCAAGCAGTTGTCTGAAAAACACAAGACTGAGATTACTCAC
 AGAAAGAACTCTTCTTAAAGAGTAACTGGCACTTCTGTGGAGTGTCCACCATCTCTCAATCACTTCTCTCACAGAATGCA
 55 GGTGGGGTGTCCCTGGACTAATTTGGGGCACAGGACTGACATTTGAGGCTCGTGATCAGCCTGGTGGTATCTCGCAGGACTCCTGT
 AACCTATAGGCTGGCTCCACCTCAATATGATCTGAGTGGTGGTCTGAGCTCTCTGGTCTCCGACCTCCACTTCTGGATCTGCT
 TAACAAAGTGAGCCAAATACCTATGATGATATGTAAGTGTGGGATAGAATCCAGGGTTTGTGTCATGATAGCAAGCACT
 TCCTGAGCTATGTGACGTACCCTGTGATGGAATTCCTGGCTCTTCTCTCAACCAATGTTATTAACATAGGAATTAACATTT
 60 GTCAGGTGTTTCTGGTCTTGGGAGAAATCAATGAAGAACAGCAACAACAACAAAAAATAAATTTGCCAATGCAACCCAAAT
 CTTGTCTCTTGTGGTTTATAATCTAGGAGACAAATGGGAGTAAGAATATAAATAAGCAAAGCAAGCCAACAAATAGCACCATGAG
 GTAGTGAGTAATTTATAAAGAGTGGACTGGTATAGAGGAATCAAGATTGCCACAGAGGGGATGGGGAGCCAGGCCAGTGCAG
 65 ATGCACTGGTCTTGGACCTGTGGAGGAAACGCAAGGTGACTGACAGGGCTGCTCAGCCACAGAGCAAGTGTCTCAGGTTCTC
 CATTAGTCCGCTCTCCCTCTCACACCTGGACATGCGTGTCTCTACTATGCTCTTGGCTATCTGCTGAAAGCGAAGCATCAA
 ACTATGATGACGCTCGAGTCTGATTCCCTGGGACTGAGTCCACAGTTAAACAGTTCCTCATATTGTTGGTGACCCCGAGCCATAA
 AAGCATTTTTGTGCTACTTCTAATACTATGATTTTGCTACTGTTATGAATCGTAGTGTAATATCTGATATGCAAGATATCTGATA
 70 TGAACCCCGAGTGAAGGGCTGTTCAACCCCACTGTTTCCACCCACAGACTGAGAGTCTCTGCTACAGAGAAAGGTGTGTGTG
 TGTGGGGGGGGGGGTTATTTGGTATCGACAGAAATGTTCTTGTGTTCTCTGATTTTCTAGGAAAAAAGGACTATTAGAA
 AATGAGCAGTAAGCAAATATATAAGCTGACCTCAATGAGAATCTGACAGCTTTTGTACCCCAAGGCTTTATAAGACCT
 75 AAAAAACGGGCGCTTTGGAAGAGTAAGGTAGCTCTGAAGCTTATTGAAGACAGAGACAGATCTTAGAACCTGTAGATCTCAC
 GGACCATCTATGCTTCTACAATGGTTTATAGTTCTCTTACTTGTAAAGGAAATCCCTCATAGGCGACTGACCAAGGCCACCT
 GATCTCTTGTACTGACAGGTCATACTACAAGACATCCATCTGAAACCTTTGACCAGAAGTAACAGAGCCTGTTTATAGTGG
 AAGCATGGCAGCTGGCTGGGACAGTGCATATTGGGGAACACACACACACAGCTAGGCTGCTAGTGTGAAACGTAGG
 TGATTGGCGGAGCATGTGTGCACTGAGCGGCAGCGTCCAGTGGACTTCTCTGCTATCTAGCAGGCGACAGATTTTTTCAGGC
 CTTAAGGCTTAACAGATCTTTTTTAAGGATTATTTTATTTTATTCTGTGTGTCTGTGTATCCCAATGTACCTTCAGATGC
 CAGAAGAAGTATCAGATCTCCAGCACTGAGTTAGAGGTAGTTGTAGGCACTCAGTGTGGGGTGGGAATCAAACTCAGGCTC
 CCAGGAAGAGCAACAAAGGCTCTTAAGTGTGAGCCCTCATTTATGCCATAATCTTTTAAGTTATTCACTTATTATTCTG
 TCACTCAGTGGGGGGGGGGGGTGCATGCCACAGTGCATGATGATAGAGGTGAGAGGCAACCTGAGGGAGTCACTCTTTA
 TTTCCAGACAGCTGGGCTTAGGAGAGATCTTTGGCCATCAGGCTCAAGGGCAAGAGCTGTTTTTTTTTTTTCGATGAGCA
 ACCATGTCAATGGCCCTGTAGAGAATCTTTGAGAGGCAGGAAGCAAGTAGAGGTCTCTCTAAAGTTTTTCTGAAGTGAGAAA

MOUSE SEQUENCE - mRNA

[illegible]

[illegible]

MOUSE SEQUENCE - CODING

ATGCCAGCTGCACCGCGTCCACCATGCGGGGATGATCTGCAAGAACCCAGACCTCGAGTTTGACTCACTGCAGCCCTGCTTCTA
CCCGGAGCAAGATGACTTCTACTTCGCGCGTCCCAGACTCGACCCACCGGGGGAGGACATCTGGAAGAGATTTGAGCTGCTGCCCA
GCCCCCGTTGTCGCGCCAGCGCGCTTCCAGAGCACAGCCCGAGCCTTCGAATTGGGCTACGGAGATGCTGCTGCGCGAGGCC
75 GACTGTGGTGGCAACCCGGCGAGGAGATGCGTTGCGTCTCGGGGGCTGGGTGGCTCTCTAATCCGGTATCTCTTCAGGA

CTGCATGTGGAGCGGCTTCTCTGCCCGTGAGAAGCTAGAGCGCGCAGTGAACGAAAACTACAGCACGGCCACGGGCCCCGGGGC
 TCAGCTCAGCTGCTCGGCTCCCGAGTGGGTGCGCAGCAGCCCCGGGGCCGTCGCCCTTGGTGGGTGCTCGAGTGTCTAGCCACACC
 GGGGCCACCTTGCTACCGACCTCTCCACCCGGCTGCCGAATGTGTGGACCCCGCGTGGTCTTCCCTTCCCGTGAAACAAGCG
 AGAGTCGGCGTGGGTGCGCGTCCCGCAGTACGCGCCCGGCGAGCAGCGCTGCGGTCTAGTGTGTCTGTTCCAGCTACTGCC
 5 CGGTGGTGTCTCTGCTCGTGCAGGCGGCGCTCTGCGCAGCAGTGGGGAGGCCAAGGCCCTCAGCACCTCCCGAGAGGATACCTTG
 AGCGACTCAGATGATGAGGATGACGAGGAGGAAGTGAAGAGGAGGAAATCGATGTGGTCAACGTAGAGAAGAGACGTTCTCTCT
 TAACAACAAGGCGGTAAACCACTTTCAGATCACTGTGCGTCCCAAGACCTCCGCTCTGGGTCTGGGGCGAGCACAGCCTGGCGAGC
 TGATCTCAAGCGCTGTGTTCCCATCCATCAGCAGCACAACTATGCTGCACCTCACCCTACGTGGAGAGCGAGGACGCGCCCCG
 CAGAAAAAGATCAAGAGCGAGGCTTCTCCACGCCCCCTCAAAGTGTGTTCCAGCAAAAGCGAAGAGCCTGAGCCCCGAAACT
 10 AGACTCGGAGGACAGCGAGCGCGCGCAACCAACATCTGGAGCGTGAGCGCGGAACGACCTGCGCTCCAGCTTCTCTGACGC
 TCAGGACCATGTGCTGAGCTGGTGAAGAACGAGAAGCGCGCAAGTGGTCTCTTGAAGAGGCCACCGAGTACGTGCACGCC
 CTACAGGCCAACGAGCACCAGCTCTGTGGAAGAGGAGAACTGCAGGCGAGGCAGCAGCAGTGTGTAAGAAGATCGAACAGCG
 TCGACTTGCTAA

15 HUMAN SEQUENCE - GENOMIC
 TACAGATATCTTCCCTTATGGAATAAAGCAGGGATAGGGCTCATTATTCCGATATTATGAACCAGGAGAAGTTAATGGACCGAT
 CTAAAAATCTCTCAAGAAGTAAGACACAATTCTAAGCTTGAAGAACTCCAGTCTCTCCCCGGGTGACCTGTGTTCTTACTAGGAC
 TACCTTATACCTTACTCTGAGTACCTTCTTCAAGCCTAAAGTTACTTGATTACGGACAGCCATGAAGAGTAAGGGGTG
 TGGCCAGAGAGATTTCCAGTTGAAGAAGAATGATTCAACAGTCCCATTAACCAAGAGACATTTTCTGACGGTCCCCAGGA
 20 CACATGCTATGCTTATGTGCGGGGTACATGGAGCCCCCTGCAGGAGGGCTGGGACTAGAAGGAAGGAGGAAACGTTTACTG
 GACATCCATTATAAGCCAGATGGCTACTTGTGTAATCTCCATGATGATCTAAAGAAAGATGAAAAATGGCCGGGTGTGGTGGC
 TCACTGCTGTCATCTCAGCACTTTGGGAGGCCGAGGCGGATGGATCACTTGAGGCCAGGAGTTTGAGACCAGCCAAAGCAATGG
 TGAAGCCCCCTTTCTACTAAAAATACAAAAAATAATAGCTGGGCACGGTGGCTCGAGCTGTAATCCACGATTCAGTATGC
 TAAGGCACAAGATCGCTGAACCCGGTAGCGGGGTTCAGTGAGCCGAGATGGTGCCACTGCACTCCAGCTGGGCAACAGAG
 25 TGAGATTCTCTCAAAAAAAGAAAAAAGAAAGAACAGAAAGATGGAGAAATAAGCCTCAGAAAAAGTTGGACTATCCAACA
 TGCAGAACTCGCTGTCTGTGTCAGAGCTGTCTTCCAGCATTGCTGCACAGATGCTGTGAATAAGCAGAAATGA
 ATGGAAAGGGTGTGCACTCAGGAATGCTCATCTGTAGGGGAGTGCACACACACAGGAATCTGATAAAGAACCCCCATG
 GCGGGGACGGGTCACTCACCTGTAATCCAGCTCTTTCAGAGGCGGAGGCGTGAGGTGCGCTGAGGTGAGGAGTTTCAGAGCAAG
 CTTGTCCAACATGAGAAAGCTAAAAATACAAAAATAGCCGGGCGTGGTGGCACGCACTGTATTCCAGCTACTCAGGAGGCTC
 30 AGGCACGAGAATCGCTTGAACCTGGGAGGAGGAGTTGCAGTGAGCAGAGACTGCACCACTGCACTGCAGCTGGGAGACAAGAGT
 TAAAAATTAATAAATAAATAAAGAAACCCCTTGTGGCGGCAAGCAGTATAAGATTAAAGAGATTGGGGCAGAGAATGGG
 TAGGGTTAGGGGAAGGAGGAGCAGATTCCTTCCAGCAGTCTCCAGCTGAACCTTGAAGAAAGAAATTTGAATAAGCAGAAATGA
 AAGGAAAGCCTTCTAGCCAGAGTAGCAGCTTCTGGAATAGCAGATAGAATCACTGATATTTATCAGTGATTGTTATCTGA
 GTCCAAGGAACTGAAGGGCCAGCAGGAGATTCTAGCAATCCACTCAGATATTGAGGTAGCTCGGGCCGCTCATGGGGCTACA
 35 GGAATGTATCCAGCATTATAGGAAAAATGAATTAGCAAGAACTAGTGGGTGAGATCAGCCATCTACTAAGTAATCACTGAGGAGA
 AGATCTGAAAACTCAGCACAGCGGAGGTGATCTGGACACATCCAAAGCACGTCATTGTGCTGGAAAGTAATCCAGAAAAAGG
 AGACCCCTGTCTCTGATAGAGGCTGCTGTCTTCAAGGGGCGAGCGCAATGGACTCAAAGGCCAGATCTGGCATTAGAAATCCT
 TGTAGCCCTTACAGATTCCTACTAAGATGAGGATCCCTAATGTGAGCCATTCCAGTGCATGACAAATCAAGTTTGAGGCCCA
 CAAGGGGAAACCTATTCTCCCAAAACCCATACCTGTGGAGCCTGGCCCTGAGCAGCTGCTCCAGGAGACCTTTCCATTTT
 40 ACTTTAGCATAGGAACTAAGGAAATAGAAATTCAACTCCACAGCAGCAGTATCACCGTCCATTCCCGTAGCTCTTCATGG
 TTTGAGTGCATTTTGACTCACTCCATCTTAGCCCTCTCAAGTCTACGTAATGATGAAGCTGGAGGGAAGTCTTCACAGTGA
 AGGGTCTTTGAGCTGCTCCAGGATGCAAACTAGTCTGTAGGGCAGTCCAGGGTCTGCTGGACACTTCCGATTTCTAAATCA
 GTAATCAAATTAAGTGCATTAATGAAGATAATTTTGTTTTAAACCTAATATGCTATTACAAATAAACTTCCACCTCAAAA
 45 CTCTCTAGTGGTGGATCTCAAACTCTCTCCAGCCTCAGATGTCAAAAACTATGCAATTTGCTTGGGCACATCAACATCATA
 TACGTTGAATGCTTTGATGGGCATGATTCTAATCTTAATTAAGCAGTGCCTGTTTGGTCCATCTTGTCTTTGAACCCACT
 CTCAGCTGACTCAGTTCATAGCAGTTTGGTGGGAAAAATGCCAAGTGGCTGGGAAACAAAGGAGAAATTTGGGGGTGACTTTAG
 GCTTCACAAAAGGGTCCCTTACATCACTTGAAATGATTAACTTTACTGAAAGTAACAAAAATTTTGGAAAAATACAAAAACA
 50 AAGAAATTAATTTGTTCTATAACCCACTTGCTTTAAAAAATAAAGTATAGGCCAGGCAGTGGCTCAGCGCTGTAATCC
 TAGCACTTTGGGAGGCGGAGGTGGGTGGATCACTTGAGGTGAGGGCTCGAAACAGCCTGGCCAAACCGGTGAAACCTGTCTCT
 ACTAAAAATACAAAAGTTAGCCTGGTGTGGTGGCATGTGCTGTAATTCAGCTACAGGGAGGCTGAGGCGAGGAAATCACTTGA
 ACCAGGGAGGTGGAGGCTGAGTGCAGCCGAGACCGTGCATTGCACTCCAGCCCGGCAATAAGGCGAGACCCATCTCAAAAAA
 55 AAAAAAATAATTAAGCATAGTGGCGGTGCTTAATCTCAGCTACTGGGAGGCTGAGGCAAGAACTCTGAAACCGG
 GAGGCGAGGTTGCACTGAGCCGGATCAGCCACTGCACTCCAGCCTGGATGACAGAGCGAACTGTCTCAAAAAAATAAATA
 AATAAATAAAGTTATATCAAGAAGAAAGTTCTCCCTCCACCTGACTGATTGTCTTCTCAAGTAAACCCCTGTAGCACTTG
 60 GTGCACATTTCTCAATTTGTTACTGGGGGTTGATGAGATATCTAAGTACATATATCAAAATGCGAGACAGATTGACC
 TATACCTTGCTTATTTCTTCTAGTTTCAAGAACTTCCCGTCTGTAATATAGACCTAACACATTATTTTAGTGGGTGATGT
 AATTCACCTGCATGGATGATTACATACCATTTCTCTGTTTAAATTTGTTTATGTTATGGATATTTAGATTGCTTATAGTATTTT
 TTATTGAGAAATGATGCAGCCACACATTTCTGTTTATATGCTTTTATGTTTGTCTTATTATTCTCTGATAGGATGGATCAAG
 65 GAGTGAATGCTTTTCTCTTGGGCGAGGCACCAACAGTGTATGTGAGGCCCTGCTCCCACTCCCAGGCTGGCCAGTACTT
 TGGGCCAATCTGCTAGACCAAAAAATGTTAATCTCACTGAGATTAAATTTGCACTTCCCTGACTACCGGTGAAGTTGAGCATTTT
 TCATATGTTTATTGACAATTTGCAATTTCTTATTCAGTAAATTAACCTGCTCGTATCTTAGAGTCATATTTCTGTCTGCCCTTTT
 TCTATTCAATTTGTTGGGAGCTTTTGTATACCTGGGATCTAATCTTGACTCATATATAGGCAAGTATTTCTATTACTGTTGTC
 AACTTTTTATCATAGTAAATTTCTATCCAGCACCCCAACCCCTCCCTGCCCCCTTTTTTTTTTTTTTTTGTCAATTTGGGTAGGC
 70 AGAGAGCTAGCTTTACTGTTTCCAAATGAAGTCAATCGATCCCAAGGATTTTAAATTAATTAATCAGTAAAAATGTACACATTT
 TGAGGAGGTGTGAAGATCTAGGAGAACTGTGCTCTGTGCTGAAAGACAGACTCAGTAGATCTTTTTTTTTTTCTTTTGAGA
 CAAGGTCTCACTCTGTCACTCAGGCTGGAGTGCAGTGGTGTGATGATGGCACACTGCAGCCTTGATCTCCCTGGGCTCAGGTGATC
 TTCTGCTCAGCCTCCCAAGTAGCTGGGACCACAGGCACGCCACCCACAGCCAGCTAATTTTTATATTTTGTAGAGACAGG
 75 GTTTCACATGTTGCCAGGCGGTCTCAAAATCTGGGCTCAAGCCATCTGCCCTCCTCAGACTCTGAAGTCCAGGATTAAG
 GCGTGAGCCACCATGCTGGCAACCCAGCAGATCTTAAATCAAACTGGAAGAAACCATCTAGAGGCTGTGTCTCTTAGCCA
 GTCATGATTTGGGCCCTCTCAACATGTGTATGTGTGTGTTTCTTGTGTGTGTGCTTAGTAAAGAGGAGATTTGTAAC
 TAAATATTCTCTCTCTCAAAATCACTTAATTAATAACCAAAATGCTGTGATAACTCTATCTAGCAGTTGGATTTAGATTG
 AGGCATCCATTTAGATGTGGGTCTCTTCCCTGGTCCAGTGTGCTCTTGGGCTGTACCTTAACCTTACCTGTGTTCCAAAC
 CACCAGGGCTCAGACACAGTAAATAGTGGTACTGTCTCAGTTCATTTTGTGTGCTATAACCTAATAGCACAGACTGGGTAA
 CTTATAAAGAAAGAAATGTAATTTCTATGTTTCTGGAGGCTGAGAAGTCCAATATCAAGGTGCCAGCACTTCA
 TGGGTATACCATCCCTGGCAGGAAAAAGGAGAGGAGGCAAGAGATCAAACTCTAGCTCAAGCCCTTTTATAATAGCATTAAAT

CCATTACAAGAGTGGAGCCCTCATGACCTAAACACCTCACATTAGGTCCTGAGACAGGAATAATATAAGGTGGCTGCAGAATAAT
 AGAAGATTTTGGGCAGCAATTTACATGACTAGCAAAAGGAACTGTTGAAATGGCTGCAGAGGCCATGGGCTAAGACCGTGAAAA
 ACAGAGTGTAGACCAAGCTGGCTAAGACCCACTGAACCCAGCATGGCACTGGATTGACCTAGGTTCTCCTAGGACCTCATTATA
 5 CGCTCATTAATCACTAAATCACACACCCCACTAGCATCATGACACTTCCGAGAACACCCATATTGGTTTAAATATAGGTGGTGT
 CACAGTCTGAGAAATCTCCTCTTTTCTAGGAATGATCATGAATATTCGCTCTTGGTTAAAGAAACCCGTAAGGTAGCAAC
 CCCAAACCCCTTTCTGTGTAGTCTCTCGAGTACACCCATATTCCTTTTCTGTAGTGTGTACTTTTCCCTTTGCAATAAATCGTA
 CTTTCATATTTTCCAACTGGTCTTGAATTCATTCTCTGTAGTGTGTCAAGAGCCTGGACACTGGCTGGGGTCTAGGTCCCACTG
 GCATTTGGGGACCTCCCTCCAACACTGTTGCACTGGGGGTTAACTTCCAACGTGTTTTTTTTGGAGGACACATTCAAAACCATG
 10 GCAGTACTGAACAAAACCTTGGCTTTGAAACCATATGAAGATTGTTTTGTGTGTGTTCACATAGTTGAAGTATTTCAACATTTT
 AAGAGGGATTTCAGGCTTCTCTATAAGCAGACTAAGAATCAGCATTAGCATGTTTTCTCATGTACAAAGCTTTTATCTTTCTA
 CTTACAAATGAAGTAACCAATAAATATTTGTTGAATTTTATCATTCTGTTAACCTTCAGATTACAGACTTGTCAAGTAACTACTGGC
 TTGCATTAAAGCAGGAGATTAGAGATTGAGGTCCAGGAAGTATAATGATTGCTCAAAGGCATGTAGAGTAACCAAGGTCTCCTG
 TCCCTCTGTCCCCCTTTCTGCTACACCTTGTCCCTCGACAAAGGGTGAATGACCTAGTGTGTCATTCTATCTGAGGAGAAAGGA
 15 CAAAGGTAGGACTTTGAATCGGAGCACTGAACCCATCTGGCTATTTTACAGTCTTGCCACAGAAAGATCTGGCCAGGCTTAGAA
 GGACTCATTAGTGTATTTGGTCTTGAATAATACCATGAGTACTTACTATATACAGGTACACTGTGTGCCGTAAAGGATTCCCTCT
 GGAGCAAACTGACCCAGGTACAGGTTAGTGAGGGAGACTGAGCCTGTCTTCCACAGTGTACGGAAGTGAGCACTAAACAAATA
 TCCCGAGCATGGATCATTACAAATGGAGGTGAGTGTGGCAGGAAAGGACAGGATCTAGGCGAGAATCAGCAGGAGCTTGG
 20 GTGGCGATTAGGGGCTAGGAAAAGCAGAAGTGGGGCTGTAAAGGCTTTTGCAAAGATGAAGGCTTTTACATTGTGTAGGAAA
 TACAATAATAAAGGTGCTTGGAAAGGGTGTCTATCCGATTGATGGGCTCTTCTTGAAGTCTGGGAAATCTTCTCCCTAGAGC
 TCTGTAGGCTCCAGGGTCCAGGGTGGAAAGGCTTCAAAATGCTAATCTGTGAGCATTTTATGGGTTGCCCTGACCCCTCAGC
 ATCTCTCTCTTAACATAGATCCAATGGTGGTGAAGAGTGGGGCGATGGAGAATGGCATTTCAGTTTGGAGAAAAAGTAGG
 GAGAGGGCGGGGACCTTCCACCCCAATCCAGGGCCAGGTTCCCTCTCTCCAAACAGCCTAAGGAATGTTTTCAAGGCCAAA
 25 ATCCCACTCACTGTGATTTTGGTTGTGAAGGGGGCTGTCCAGGAGATCAGGGTTGTTTTGGAGAGTTTGGAGGCGAGGGCAAT
 AATGTCTGACCCCTGCAACAAATACACCTGTGAAGAAAGCTAGACCAGAGTGAAGTAAAGCCAGGATTGTATGGTGGCGGGAAG
 GGAAGGGGCAATGCTGCTGTGACAGAGGGGTGTTATTTCCCAAGAAATAGCATGTGTGGTCAATCATATAATAGCT
 AACTGAGGCAACAGAAACGAAGTAGTGACAGCAGCTTCTCTTTTCCCTTCAACAGTTTGAATCAAGCTGTTTGGCCGAGGC
 GACACAACTATTATGGGCTGGGACTTATAAGAGCTTCTATACTCTCAGTAGGAGGCACTACGAACCTCAATTCAAAATAGG
 30 AACTGAGGCAACAGAAACGAAGTAGTGACAGCAGCTTCTCTTTTCCCTTCAACAGTTTGAATCAAGCTGTTTGGCCGAGGC
 TGGGTCTCAGGAGGTGTGGACAGCACTTCCATCTCGGTAAATCAGATTGCGCTGCCATAATTGGGGAGAATGGTGGCTTTGAAAA
 GGTTAACTTGGGAGCCCTGGGGACGGCTGCAGGGAACGTACGCCATTCCCTTAGGAAGCAGGCCAGGCCCTCTCTCTCCG
 AGTGTAGGACGGTGGACAGTCCCGCGGGGCGCGGAGACCTCGGAGTGGCCGCACTCCAGGTCCGCGCAGGCTCCGCGGCA
 35 GCTCCGCTTTCTGTCTAGTCTCCGCGAGGTGTGCGCTTCCGCGGAAGAAACACCGCGCGCCCTCTGTAGCTCGCACTTATTT
 ATTTATTTATTTTCAACAAAGGGGGCGCCCTCTTCTTCAATTTGAAACTGGAAACATCCAGAGGTCTTGTCTTAAGGGGGCG
 CGTCTTCTCTCTATTTTGCACCTTCCGACTAGCTTCTTCTGTAATTACACAGGAGCAACCTCCCTCGCAAGGCTTGTCTCAAC
 GTTGGCTCCGCTCAGCTGCACAACACGAGTCAAAGCGGGGGCTGGGTTAGAAGCATCGGTCTCCCTCCCAACACACACCC
 40 CCGAGCCCTCCGTAATTTTTTTCTTTAATGACAAGCAATTGCCAGGCTCGCAGGTTGGGTGCTGCATTGCACCGCTCCGCGC
 CAGCTGGTCTCAGATGCAAGCGGTGCAAGCCCGGGGCTCCAAAGGGCGGGAGGAGCACCCCTGGGCTTCCAGCTTTCAGC
 CTTCTCTCTGCAAGAAAGCAAGTGGCTTTTGGCGCAAGGCTTGGCGCTCCCTGATTTTTATGGAATCAGGAGGGCGGGG
 TAAAGCCATTTCTCTCTCTTCTCCCTCCCTCTGTCTGCGCCACAGCCCTTCTCTCCCGCCCCCGGGTGTGCAGATTTT
 TCAAGTTAATAATATCCCGAGCTTCAAAGCGCAGCTGTGACAGTCTGTCTGAGCGCTGGTGGATGCGACGTGCGCACCGGGG
 45 GGAAGTGTGTGGAGCGAGCAAGCGCTAGCCAGGCGCAAGCGCGCACAGACTGTAGCCATCCGAGGACACCCCGCCCCCGGC
 CCACCGGAGACACCCCGCGCAGAATCGCTCCGATCCCTGCACTCGGCGGGAGGTAAAGGAGCAGGGCTTGAACCCCGCGCG
 CCCAGGAAGCGAGCGCGCGGGCAAGGCCCTGGAGGGATTGCGACGTGCGCACCGGGGCGCTAATGCGGGGGCTCCG
 CTGTTCTGCTTCCGAAACAAACCATCTCTGGGTTTTCCAGAAAGCCAGTTCAGCCCCGAAGGCATCTGGCTAGAGGAGAC
 CCGCCCTAATCTTTTGCAGCCCTTACCGGGGGGAGTAATGGCTTCTGCGCAAGAAAGAAATCCCTCGGCTCTAGAAGATCTGTCTGT
 50 GTTTGAGCTGTGAGAGCGCGGTGCGTCCCAACCCAGGCTGGGGTCTTCTTCAAAGGGTGCCCTGGAGGAAGAGGGGGG
 ATTAGGCGGGGAGGAGTTCGCGGTGCGAATCTGGGTGCTGTGGTCTGTCTGAGAGGAGGCGGCTCTCCCGGACCTCTCC
 TCGCGCGGGCGCCCTGCCATTCCCGGGAACAGGGGCTCAGCCTCTCCCTCCCTGGAAGAGGACGTTGTCTGGGTTTGAAGAGC
 AGGGGTGGGCTTAGAGAGCTTCCAATTAAAGCTATTGGCAGGAGTATCCCTGAGCGGGTGAATGCCAGGGGGGCTTTGCTCAAAAT
 55 TGGGAGAGGAGGAGTGTGGATATGGGTGCTGTGTGGTCTGTCTGAGAGAAAGGCTTTTTTTTATTTGCAAGTTTCTA
 AATCCCTGCTATCATTGTCACTCTGAGGTGCAATTTTACAAGGGGGTAGAAGGTACTCCAATACCATTCGCGGTAGCTGGG
 TCGGAGAGCTGGGGCTTCCCTGAGCAGCGGCCCAACCGCTGCGAGTGGGTTGTCTGCGTCTGTGAGAGCTAGAATTTCT
 GCAGCGGGAACACGCCCTCCCGAGGCGAGCTTGTGTGAATGAATGGCAGTTTCAAAGTTGCGGAGCTTCGCCACCAACCC
 60 CCGCATCTGCATGCCCTCCCAACCCCTGTCTGAGACAGTGTGTACACAAAGGAGGGCGGGAGGGAGGAGGAGGAGGACAA
 CTTCTCCACCTTCCGGAGCAGTGGGAGAGTGGGGGCTTGGAGGGAAGATTGGGGAACCTGGTTAGAGGGGGCGCCATTGCTT
 ATCCCTCGGTCTGCCCGTTTGGCCACCTCTCCGCTGTCTGTCTGCTGCTGAGGTGCGGCGCCCGGCCCGCCCTTCC
 GCGCCCCCAGCGGAAGGAAGACCCCGGTATTAACAGAACGGGGCGGAAGAGCCCTCAGTCGCGGCGGGAGGCGAGCGG
 65 ATGCCGAGCTGCTCCAGTCCACATGCCGGGCGATGATCTGCAAGAACCCAGACTCGAGTTTGAAGTCTGCTACAGCCCTGCTTCTA
 CCCGAGGAAGATGACTTCTACTTGGGCGGCGCCGACTCGACCCCGGGGGAGGACATCTGGAAGAAGTTTGAAGTCTGCTGCCA
 CGCCCCGCTGTGCGCCAGCGTGGCTTCCGCGAGCACAGCTCCGAGCCCCGAGCTGGGTACGGAGATGCTGCTTGAAGACGAG
 70 CTGTGGGGCAGCCCGCGGAGGAGCGGTTGCGGCTGGGGGAGTGGGTGGCTCACCCTCAACCCCGGTATCTCCAGGACTG
 CATGTGAGCGGCTTCTCCGCGCGGAGAGCTGAGCGCGCGGTGAGCGAGAGCTGCAGACCGCGCGGGGCTGCGGGAGCGCGCGCGG
 GTTCCACCGCCAGTCCCGGGAGCGCGCGCGCGCGGCTGCGGGCAGCGCGGGGCTGCGGGAGCGCGCGCGCGCGG
 GCGCGCTGCGCGCGAGCTCGCCACCCCGCGCGCGAGTGCCTGATCCCGCGTGTCTTCCCTTTCCCGTGAACAAAGCGCGA
 GCGAGCGCGCGTCCCGCAGCCCGCGCAGTCCCGCGCGCGCGCGCTGCGGTGCGCTCGGGGCGGGTATTGCGCGCCAGCGC
 75 GGGCGCGGGGGTGCCTCTCGCGCCACCGCGCGCGCGCAGACAGCGCGCGCGGACCAAGGCCCTCAGTACTCCGAGAGGAC
 ACCCTGAGCGATTAGGTAAGACCGAACTCGGGTCCGGTGCCTCTCTGGGGCACTGGACCCCGGGTCCGCTCCCTTTGTAGT
 GCTCGTATGTCTTGGCTGGGGAGCAATTTGGAGGCGAGTGTAGGGGAGAGGTCCTGTTTCCCCAAGTCTCTCTCGGGTA
 AAGAGAAGGGGCTGAGAGAATGCCGTGCAAAAGGGGTGCTCTCAAATCTCGCTTCACTAAAGTTCTCTCACCTCTCTCTGGG
 GAGCCCTCTCTAGGCCATCACGGGCCCTCACCGGTCCCCACCTCTCTTTTGCAGCGCAGTCTGAGGAATAAATTTGAGAAAG
 TTGTGGCTAAACCGGGTGGGGGTTTGGGGGTGCTGGGTGCACTGCTGGACAGAAACCTGTTAGCGCAGGGGTGAAGGGACT
 CTTGCGCCAGGTGAGGAGGGAAGACATCCGAGAGATTCAAGGGCTGTGCAAGCCCTGTTTAAAGCCGAGCACTTATAG
 GAGGGTTGACAGATGGCTAGAGCGGATTTCTATTCTTTTTCTTTTTTTTTTTTTTCAATGTGGTACCTTTCCCTT
 CCCCCTCTCGTGGGTGGTGGGCTATTGCTCTGCTGCGTGGCGCAGAGGCGGATATGCGAGGCGCAGCGCGGGCGCGG
 ATCTGAAGGCTGGGGTGGTGGGGCACCTCCCTCCCTCATTGACAGCTGGCTGCAAGTGAACAGCACTTGTGTACATTCT
 CAGGGGCTCTCTTCCAGTGTGAGTGGAAACTGGTGTGTTGCTTCCAGCTGAATTCAGGCTTAATTTGAGATGTG

AGTTGTATCTGTAACCCAGTGCCTTGAAGGTGAGGGCAGGCACTCAGCAGCCTCTCCAGGAAGGCTCACATCTGGGAGGACTCA
 CTGATTAGTTCTATTGTGTTCTATTGTCTGTGCTTAAGCTGAAGGGAAGAGTTAAACCAAGCCTTCCCTGGGGGTCTGGATGA
 ACAGAACTCAACCCAAAGAGTGGCATTGCCTTGTCTCTGGAGCAGGGAGCTGGGACCCCCCTTGGACTTTGAAAACAGAGTGTTC
 5 AGAATGCAGGTGGGATAACAAGCTAAATTTACTTCTGGGCTGAGGAGAGATCTTTGAGGCTCTGGAAGGAACTTGGTGATAAGC
 CTCAGTTTGAACCGGCTCTGTCCCTTTAATGTCTGTGCTTGACAGCTTTTGGTGAGGAAGCACTTCTTCCAACAGCTGTCTTC
 TTGGCAGAAAACCAAACATTGGCTTAAAGGGACCCACAGACTGGAACAGCCTCACATTTCCGGCTTTAGAACAAATCCCACAAATG
 TTCAGCTTTCGGTCCCTTCAGATCAAGCAGAAGATATGTTTGTGATTTTCATGCTTGTATTTTAAACAATAATTTCTACCCCGAG
 10 CGTGGTAGTCAATGAGGAGAGAGGGAAGAATGCGCAGATGATGCTACACGTTTCTGTGTTGCTGTTATTATTGGTGGCTTTGAG
 GAGAGCTGCTCCCATTTGGGGGTTTATACCAACTGTGGATTATGGCTTTGTCAATTAAGATTGATCTTTGTTAAATGAAAACCTGT
 TTATTGTATAAACTCAGGTTTGTGGACGAAAAGTTGTTTTTTTCTTCAGTTAATTAAATTTGTTCTCAAGTTTGTTTAAGGACT
 TAAATCAAAACACAACCATGTGTAACTGCTAAATGAGGCTCCTAAATGAGAGGCTCAACTCTTTAAGTGTGGAGCTGAAAATG
 TAAATAAGTCCACAGGGCAGACTGGTGATTATGATAAAAGCTACCACTTACTGAGCATCTGTCTACTAGGCTCAGCTCTATGCTAA
 15 GGTCTACATGTTATCTGTCAAAGTGGTATCATCCCCATTTAATAGCTGAGGAAACAGAGGCTTAGAAAAGGCTGGGTAACCTGACGAC
 GGTCTAGCAACTAGTCTGCGGTGGAGCCAGGATTCTGTCTGACCTAAAGGCCAAGTTCTTTATATTATTCTTACCACCTGTCTAA
 AGTCTTGAATGGAGGCTGAAAGCACAGTTGGGGTATGGGGAAGAAAAATATATATACATACATATATGTATATGTATGTATGTATG
 TATGGGGGTTGTTTTGTTTTGTTTTGATAGGAGTTTGTCTCTTGTGCCCCAGGCTGGAGTGCAGTGGTATGATCTGGGCTCA
 20 CTGCAACTCCCGCTCCCGGTTCAAGTCATTCTCTGCTCCAGTCTCCGAGTAGCTGGGATTACCGGAGCATGCCACACCC
 AGCAAAAGTTTTGTATTTTGTAGTAGACAGGGTTTACCATTGTGGCCAGGCTGATCTTGAACCTCTCATCTCAGGTGATCTGCCC
 GCCTCCGCTTCCCAAAGTGTGGGATTACAGGTGTGAGTCACCGCTCCGCTACAGATATATTAAATTTAAAGAGATCTAAAAC
 AAATCAAAACTGTCCACATCTATGTTGATGGACCATAAAATAGCAGTCTGCCAGGGTCTGCCGGAAGAGACAGATAAGCATAC
 ATATTAACTAGGATATATATGTGAATTTCAATCAATGGTTCTCACATGAGAGTAACTAGCATCTTCTCTCAGATGATGAAGATG
 25 ATGAAGAGGAAGATGAAGAGGAAGAAATCGACGTGGTCACTGTGGAGAAGCGGCTTCTCTCCCAACACCAAGGCTGTCAACCA
 TTCACCATCACTGTGCGTCCCAAGAACCGCAGCCTGGTCCCGGAGGGCTCAGTCCAGCGAGCTGATCTCAACCTGATGCTTCC
 ATGCCACAGCAGCACAACTATGCCGCCCTCTCTCTACGTGGAGAGTGAGGATGACCCCCACAGAAGAAGATAAAGAGCGAGG
 CGTCCCACTGCTCCGCTCAAGAGTGTCTATCCCCCAAAGGCTAAGAGCTTGAGCCCCGAACTCTGACTCGGAGGACAGTGGCGT
 30 CGCAGAAACCAACATCTGGAGCGCCAGCGCCGCAACGACCTTCGTTCCAGCTTTCTCAGCTCAGGGACACGTCGCCGAGTT
 GGTAAAGATGAGAAGGCCGCAAGGTGGTCACTTTGAAAAGGCCACTGAGTATGTCCATCCCTCCAGGAGGAGGACGACG
 TTTTGTCTGAAAAGGAAAAATGACAGCAAGACAGCAGCTGCTAAAGAAAAATGAACACGCTCGGACTGTCTAGACGCTTCTC
 AAAACTGGACAGTCACTGCCACTTTGCACATTTTGATTTTTTTTTTAAACAAACATTTGTTGACATTAAGATGTTGGTTTACTT
 35 TCAAACTCGGTCCCTGTGAGTTCCGCTCTGGGTGGGCACTGAGGACCACTGAGTGGGGTCTGCTGGGAGCTTGGAGAGCTGCA
 TCCAGGATGCTGGGTGGCCCTGACGCTCTCCACCTCACTCCATGACAGCGCTAAACGTTGGTGACGGTGGGAGCCTCTGGG
 GCTGTTGAAGTCACTTGTGTGTTCCAAAGTTTCCAAACACAGAAAGTCACTCTCTTTTAAATGGTGTCTAAGTTCCAGCAG
 ATGCCACATAAGGGGTTTGCCATTGTATACCCCTGGGGAACATTTCTGTAATAACCATGACACATCCGCTTTGTATACATCT
 40 GGGTAATGAGAGGTGGCTTTTGGCCAGTATTAGACTGGAAGTTCACTAAGTACTGTAATAACCTCAATGTTTGGAGAGC
 ATGTTTTGTATACAAATATATTGTTAATCTCTGTATGTACTGTACTAATCTTACACTGCCTGTATACCTTTAGTATGACGCTGAT
 ACATACCTAAATTTGATACTTATATTTTCGTATGAAATGAGTTGTGAAAGTTTGGAGTAGATATTACTTTATCACTTTTGAAGT
 AAGAACTTTTGAAGAAATTTACTATATATATATGCTTTTTTCTAGCCTGTTTCTCTGTTAATGTATTGTTTCATGTTTGG
 45 TGCATAGAACTGGGTAATGCAAGTTCTGTGTTTAAATTTCTCAAAATGTATATATTAGTGTGATCTTATAGCACTTTGAAA
 TACCTCATGTTTATGAAAATAAATAGCTTAAATTAATGATGCAACTCAACCTTTCTTAAATGGCATTAACCTCTGCTCCCTTA
 GGAGCAACCATAAATATCATAACCTATAGAGGAAATTTGGTTTCCGTAATAGCCCTTTTTCACCTGTACAACTCTGGTTGGG
 GGGCATGAGTCATTGTCCCACTTAAGGTGGAGGAACTGAGTTTGGGGAATTAAGGCACTTCTCAAGATTATGCAATATAGAG
 50 ATGTTATTAGCGACTATTGTGTGCTATTGTAGCAATGGCAATTGATAATTAACAGACACTTCTGTATCTGTGGCTCTTAGTGGGA
 ATTAAGCTGAGACCTCAGATCAGTCCCTTTAAAGAAAAGTAAATAAGCCACAGGGTTGTTTAACTCGCTTGTATTGGGCTTTGG
 TAGTATTCGTCCCATTTGGCAGACAGTCTTCTATTTTAAGGTAGAGCATAGTTGTCTCCAAGAAATTCATTGTTAAACATTCAC
 TACTCTGTGGAGGTTCTAGGCTAAGCAGAGTAAAGCAGATAAAGCAGATGGAATGGGTTCTCCCTTCAATGAATCAACCTGAT
 55 TCACAAAGTGAATTAACAGAGTGACAGTTACGTAGTCCAGAGCAAGTACCAGGTGCAGGAGAGACCTGGGGTCAACATGGAGAC
 CCCATATGGGTGGCATGGCTCTCTACTTGCATTTCTATTACACAGCAGTGTCTTGGCTACTTGGGCTGCCCTTTGGAATGGGAT
 CAATCTTGAGGCTCCAGAGACAGAGCCAGACTTGTGTGTTAAGGAGATAGTTTACCTGTTGGGACATAAAGAGCTTGTCTGTA
 AGCAGCTTCTCAGAACTAAAAGTGTACAAATAACCTATTCTTTTGAAGTGTGAGGTTGACTCGGTTATTTCTCTAGGTTTGT
 60 TTCTATCTCAGATTTTAACTGTGAGCCGAAAAAAGAAAAAGGCTTTTGTCTTCACTGAGAAGAAAGCAGGTCCAGAGATGAGAC
 AGTTTGTCTTGGCTGGACACAGTTTGTGAGGGGAGAGATGGGAGACACCAAGCCATGTGTCTTGTCTGCTTTGGTCAATTTT
 ATTTGTTTCTTGTAGATGGAGTCTCACTCTGGTGGCAGGCTGAGTGTGCAATCTCGGCTCACTGCACTTCCGCTC
 CGGGTTCAAGCGATTCTCTGCTCAGCCTCTGAGTAGCTGGGACTACAGGTGTGTGCCACCATGCCGCTAATTTTTGCGAG
 65 TTTTGTAGAGACCAAGTTTCAACATGTTAGCCAGGATGGTCTGATCTCTGACCTTGTGATCCACCTACCTCGACCTCCCAAAG
 TTCTGGAATTGCAGGCTGAACCACTGCCCAGCGCTTTGGTCAATTTATAAGGCAAGTAGGAGTTTGAAGTCACTGCTCTCT
 TATCCTGCTTATCGCACACCTTGAGATACGAGGTTGGTGATACTACCATGGACATCTTCTGATGGTCTCGCATGTAGAAAATA
 AGATAAAATGCCCTTTAATTTCTCTAGTCCCCATCCCCAGACTAAAAATAATGACACCTTTCTTTTGAATTTGCTATTCAAAAA
 70 CTTCCGTTGTTTGCATTTTACAGGCCCAATCACTCAGGCTCTGCCCCGTGTGTGTGCAAGAGCCAAAGAAAGTTAAGCA
 ACCTCAATTAATTTGTACCTAAGATTCTTGAAGCCAGCTCAGTCACTCCAGTTTCTCTATTGTGATTACCATTAAGGAACCTA
 CCTGAGTGTGTCCAATGAAATGGAATGCTTAACCGTGAAGAAAGAACTGTTTCATATGAATGAGGCCATAAATCAATTCCTA
 CTATGCTCTCTTTTGTCTCGGGTGTGGGAAGCTCAGAGCAAAATCCACCCCTCTAACATCTCCAGTGGTCACTCTCTCTAA
 75 ATGTTTACGGTTTCTGTTTTCCATTGTTAGGTTAGTCATCTTTTAAATGTATATAATGTAGTATATAACATGAAAGCTTTTGTGA
 TTAGTGGAGCACAAATATGCACCTAAGGATTAAACTAAAGTGAAGAAATCCCATATTGCTTTTCTGACCTAGCTGAGGGAA
 TGTCAACAAATTTAGCTCTGCAATTATCTATAAAGTAAATGCTGTAGTCACAGAAGAAATGAAGTGTGTTCAATAACATGAGA
 AACCTCTCTGCAATTCAGAGCAGTTTGGAGACTGGGAAGAGCTCTACATCACTTAGTTCAATAAACGATAGAGCTGAGAGCA
 GCACAGAGATCATCTATTGAAATTCATTTCTCAGATGAGGGTGGGATCCACCTGGAATTAATGGCTTAACCCAGGAGACT
 AGAGCCGGTGTCTCTATGACCCGCGCAGTCCCTTCCCCATAACATTCATTTCTATTGCCACACTGTAGCTTCCCCACCTCC
 TGGCTGCGGCTCCACCTACATCATGCTCTCATATTAACCTTTCTAAACCACTACTCTTTATGCAAACTTCCACAGCTTCCCTC
 TATTTACAGAATCGAGTCCGACTCTCCAGCCAGCAGAGGCACTTCTACCCAGTCCCAACAGCTCCATTGCCCATGGCCCTCC
 70 ATGTGCTGAGCTCTGGCTGTTTCTCATCCGCTGACTTGTTCACCACTCCCTCTCTAGGTTACCCAGATTCATTAATGAAAT
 CCTTCTCAATCTTGACCCCAAGTAGGCTTTCCAGCCCTTGGCTCTGTGCACTTATCTTCTAGCTGCTTATGACCTCTG
 GACCCCTTAACTGTGGGCTCCCTTAAAGCAGATAGGCTCTCATTTGCTCTGATCTGAGCATCTGCCCTGTGACTGACAGGTG
 ACAGAGCCTTAGCAGATGCCAGCAGTATAGACGGTAACAGAGGAAGGAGCGAGGAGAGGATTTCATTATGGGTGGGTCTCCCA
 75 AACTCCAGTTCAAGCTCTCAGGCTAATTCAGATGGGAAAGACATCCCTTAGACATCAATGAGTGTCTGGTACTGACTATGCTG
 CGAGTTCTGAAGAAGTGAAGATAAATGCTCATAGAGGACTGTCTACAAGGAGCCACAGCTCTGCAAGAGAGTTAAAGCCCTGGG

[illegible]

CCGGACTCGACCCCCCGGGGAGGACATCTGGAAGAAGTTTGAGCTGCTGCCACGCCCCGCTGTGCGCCAGCCGTGGCTTCGC
 GGAGCACAGCTCCGAGCCCCGAGCTGGGTACCGGAGATGCTGCTTGAGAACGAGCTGTGGGGCAGCCCCGGCCGAGGAGGACGGT
 TCGGCTTGGGGGACTGGGTGGCCTCACCCCCAACCCGGTCATCTCCAGGACTGCATGTGGAGCGGCTTCTCCGCCCGGAGAG
 CTGGAGCGCGCGGTGAGCGAGAAGCTGCAGCACGGCCGCGGCCGCCAACCGCCGTTCCACCGCCAGTCCCGGGAGCCGGCGC
 5 CGCCAGCCCTCGGGTTCGGGCACGGCGGGGTGCGGGAGCCGGCCGCGCGCGGGCCGCCCTGCCCGCGAGCTCGCCACCCGG
 CCGCCGAGTGGTGGATCCCGCCGTGGTCTTCCCTTTTCCCGTGAACAAGCGCGAGCCAGCGCCCGTCCCGCAGCCCCGGCCAGT
 GCCCGGCGGGCGGCCCTGCGGTGCGCTCGGGGGCGGGTATTGCGGCCCGAGCCGGGGCCCGGGGGTGCCTTCCCGCGCCAGG
 CGGCGCGCAGACCGCGGGCGGACCAAGGCCCTCAGTACCTCCGGAGAGGACACCTGAGCGATTGATGATGAAGATGATG
 10 AAGAGGAAGATGAAGAGGAAGAAATCGACGTGGTCACTGTGGAGAAGCGCGTTCCTCTCCAAACCAAGGCTGTCAACACATT
 ACCATCACTGTGCGTCCCAAGAACGCGAGCCCTGGGTCCCGGGAGGGCTCAGTCCAGCGAGCTGATCCTCAAACGATGCCCTTCCAT
 CCACCAGCAGCACAACTATGCCGCCCTCTCCCTACGTGGAGAGTGAGGATGCACCCACAGAGAAGATAAAGAGCGAGGCGT
 CCCACGTCGCTCAAGAGTGTATCCCCCAAGGCTAAGAGCTTGAGCCCCGAACTCTGACTCGGAGGACAGTGAAGCGTCCG
 AGAAACCAACATCTGGAGCGCCAGCGCCGCAACGACCTTCGGTCCAGCTTTCTACGCTCAGGACACCGTGCCTGGAGTTGGT
 15 AAAGAAGAGAAGGCCCGCAAGTGGTCAATTTGAAAAAGGCCACTGAGTATGTCCACTCCCTCCAGGCCGAGGAGCACCACTTT
 TGCTGGAAGAAAGAAAAATGCAAGGCAAGACAGCAGCAGTTGCTAAAGAAAAATTGAACACGCTCGGACTTGTAGACGCTTCTCAA
 ACTGGACAGTCACTGCCACTTTGCACATTTTGATTTTTTTTAAACAAACATTGTGTTGACATTAAAGATGTTGGTTTACTTTCA
 AATCGGTCCCTGTGAGTTTCGGCTCTGGGTGGGAGTAGGACACCAAGTGTGGGGTTCTGCTGGGACCTTGAGAGAGCTGATCC
 CAGGATGCTGGGTGGCCCTGCAGCTCCTCCACTCACCTCCATGACAGCGCTAAACGTTGGTGACGGTTGGGAGCCTCTGGGGCT
 20 GTTGAAGTCACCTTGTGTGTTCCAAGTTTCCAAACACAGAAAGTCATTCTTCTTTTAAATGGTGTAAAGTTCCAGCAGATG
 CCACATAAGGGGTTTGCCATTTGATACCCCTGGGGAACATTCTGTAAATACCAATTGACACATCCGCTTTTGTATACATCCTGGG
 TAATGAGAGGTGGCTTTTGGCCAGTATTAGACTGGAAGTTCATACCTAAGTACTGTAATAATACCTCAATGTTTGAGGAGCATG
 TTTTGTATACAAATATATTTGTTAATCTCTGTTATGTAAGTACTGTAATTTCTTACACTGCCTGTATACTTTAGTATGACGCTGATACA
 TAACATAATTTGATACTTATATTTTGTATGAAAAAGTTGTGAAAGTTTGTAGTAGATATTACTTTATCACTTTTGAACATAAG
 25 AAATTTTGTAAAGAAATTTACTATATATATATGCTTTTCTAGCCTGTTTCTTCTGTTAATGTATTTGTTTCATGTTTGGTGC
 ATAGAATCGGTAAGTCAAAAGTTCTGTGTTTAAATTTCTTCAAAATGTATATATTAGTGTGCATCTTATAGCACTTTGAAATAC
 CTCATGTTTATGAAAAATAATAGCTTAAATTT

 HUMAN SEQUENCE - CODING
 ATGCGGGCATGATCTGCAAGAACCAGACCTCGAGTTTGACTCGCTACAGCCCTGCTTCTACCCGGACGAAGATGACTTCTACTT
 30 CGGCGGCCCCGACTCGACCCCCCGGGGAGGACATCTGGAAGAAGTTTGAGCTGCTGCCACGCCCCCGCTGTGCGCCAGCCGTG
 GCTTCGCGGAGCACAGCTCCGAGCCCCGAGCTGGGTACGGAGATGCTGCTTGAGAACGAGCTGTGGGGCAGCCCGCCGAGGAG
 GACGCGTTCGGCTGGGGGACTGGGTGGCCTCACCCCCAACCCGGTCATCTCCAGGACTGCATGTGGAGCGGCTTCTCCGCCCG
 CGAGAAGCTGGAGCGCGCGTGAGCGAGAAGCTGCAGCACGGCCGCGGCCGCCAACCGCCGTTCCACCGCCAGTCCCGGGAG
 35 CCGCGCGCCGAGCCCTGCGGTGCGGGGCACGGCGGGGTGCGGGAGCCGGCCGCGCGGGGCCGCTTGCCTGCGCGAGCTCGCC
 CACCCGCGCGCGAGTGGTGGATCCCGCCGTGGTCTTCCCTTTCCCGTGAACAAGCGCGAGCCAGCGCCCGTGCCTGCGCAGCCCC
 GGCCAGTCCCGCGCGGGCCCTGCGGTGCGCTCGGGGGCGGGTATTGCGCCCCAGCCGGGGCCCGGGGGTGCCTTCCCG
 GCCAGGCGCGCGCAGACCAGCGGGCGGACCAAGGCCCTCAGTACCTCCGGAGAGGACACCTGAGCGATTGATGATGAA
 40 GATGATGAAGAGGAAGATGAAGAGGAAGAAATCGACGTGGTCACTGTGGAGAAGCGGCTTCTCTCCAAACCAAGGCTGTAC
 CACATTACCATCACTGTGCGTCCCAAGAACGAGCCCTGGGTCCCGGGAGGGCTCAGTCCAGCGAGCTGATCCTCAAACGATGCC
 TTCCCATCCACAGCAGCAACTATGCCGCCCTCTCCCTACGTGGAGAGTGAGGATGCACCCACAGAGAAGATAAAGAGC
 GAGGCGTCCCCAGTCCGCTCAAGAGTGTGTCCTCCCAAGGCTAAGAGCTTGAGCCCCGAACTCTGACTCGGAGGACAGTGA
 GCGTCGAGAAACCAACATCTGGAGCGCCAGCGCGCAACGACCTTCGGTCCAGCTTTCTACGCTCAGGGACCAAGTGCCTGG
 45 AGTTGGTAAAGATGAGAAGGCCCGCAAGTGGTCAATTTGAAAAAGGCCACTGAGTATGTCCACTCCCTCCAGGCCGAGGAGCAC
 CAGCTTTTGTGGAAGGAAAAATGCAAGGCAAGACAGCAGCAGTTGCTAAAGAAAAATTGAACACGCTCGGACTTGTCTAG

Table 18

MOUSE NOMENCLATURE

ICSGNM Myb
Celera mCG2825

HUMAN NOMENCLATURE

HGNC	MYB
Celera	hCG32380

MOUSE SEQUENCE - GENOMIC

[illegible]

TTTTCATTATGATGTGTCTTATATCATCTTGTGCTGGTTCGATAGGTTTTTCAGTTTTACAACAGTGAGTTTGTAAAGTGGAGTTGT
 TAAGTGTAAAAATCTTCACATTTTAAAGTCTTATAGAGTGTAAACAAAACTAAACTGCAGAACTACTCTGTTCTGTATATGATTGA
 TGAGTTTGGAGTTCCCTTCAGCTGCCATCAAAATTCACACTGTACTCAACCGGTAAAAAGAAAGGCTGTTTGAACACAGTCTTT
 TTTTCTTTTAACTGTAGATTTCATCTGGGGGAACCCCTTGGTTTTTAAATAGATACATTGTAAGGTATTTAGACTCCATGGCAC
 5 TCAGAGACAGAGAAAACAAGAGTAAGTAGGAGTCTGAATAGCCAGTGCCCTGGCCATGTGCTTAGTTACTCAGGAGACAGCACTGT
 AAACACAAGCACAGCTTAGTGTAGTAGACACGGGGGGGAGCGTTGAATGATTGCAATTTATGTTAATCACAAAAACAGTTTGA
 GGGATGTCTCCTTTACCAGGTCTTGAATACTCTCTGATTTTTTTTCCCTAGTGCCATGGTCTTAAAGAGGTGATCACAACTAT
 ACTTTGGAATGTATTCTGTCTGGTTTTTTTATTTATCAGACTACCAGTACTCTTGAGACACACTTGATTGGTCTGTGTGTTCA
 10 GAACTATTTAAATGATTGCTATTTGCTATATGCCAGAGTTGGAGTGTGATTATAGCAAGGACATGGGCTCTGTTCTTCTCA
 TTGCTCTTAACATTGACTTTTAACTCAAGCATCAATTGGTGGGAGTTTGCAGATGTGTAACCTGTCACTGATCTAACAGTAAC
 AGGTTCAACATGCAGAGCAATAGAAAAATGCCAGGCTCTTGGTGTCTCTGTGGATACTAGTAACAGCAAAACAGTTTACAAC
 ACTCAGACACCAGAAATGCAGAAACCTCATTGCGCACTGTGCAAGGTTTGTCTCTGTAGACTTTTAAACAGCTTGCTGAAGCGT
 TTCTGTCTGAGTTTCATAATCCAATAGTTTAGATCCTCTGCTTGGCCCATGTGTGTCATTCTTATTTCTGCAGCATCTACAGT
 15 AGCGATGAAGATGATGAAGACATTGAGATGTGTGACCATGACTACGATGGGCTGCTGCCAAATCTGGAAGCGTCACTTGGGGA
 AACTAGGTGGACAAGGAAGAGGTAAGTAGTCAATTTATCAAAACGTAGGGAACCTCTGTAGAGTCTGTGATTGGTGAACCTGAA
 ATCTCGGCTAAGCTACATGTGCCCTCTGAAGACTCTTGAAGAGTTTCTTGGCATGCTGTACAGAATGCTCGTGTCTCTCTC
 CCAGTGTATTCTGTCTTCTGTTCCCAACCTGTTTATGTTCTTAAATGCTTCTCTTTTCTCTTTTCTCTTTTCTCTTCTGCTGG
 TTCTCATTCTGGAACCTCACCATTCCCTACACATGCTTCTGTGAACTGTTACTGGCCACCATCTTAAAGCTGGATGCACC
 20 CTCGCTGGTCCCAACCCCTGGGCACATGCTTGGCTTTATGGTGTGTGTACATATTGCTTTTCCCAACACACTGCCAATTC
 TTGAGGTTTAGGACTAAAGTATCTCTTCTCTTGTGTTCTCTCAAACTCAAAATTAAGTGTAGTAAATGATGAATGAATGAT
 TCTCTGGCTAAAGTGTGCTTGTCTATTTCTAAGCTAAAGTAGCCGTAGAATTTATGTTGTGAATATGCTCAGTGAACATTCTG
 TTACACATGATAGTCACATGACCTATGATGTGAAGATTATCTGAAGAGATCCAGTAATAGGAGAAGATATGCCCACTTCTTTT
 TAGAGCAAAATCATCAAAGTATGAAGAAAGGTTTCTCTCTCTACTGAACTGTGACCTTGATTGCTATCAAAATCAAGCTC
 25 CTGAGAACAGGTGGAAGCACTCCAGGGAGGCACCTTAGGGAATGCACGTTCTGTCTGTCTGTCTCAGGCCGTTGGATGCTCC
 CTTGGAGTGTGAACCTCTGTTGTTAAACATGGATTCCAGACTCTGTCTGTTTGTCTATGTTGAATGCAGAAACCTATGAAG
 ACTGTGTTTACAAAGGTGTCATGAGCTAGCATGAGCGTATGTGCTGATGAGGAGCCAGCTTGGGAATGCTAGTGTCT
 TTCTGTGTTCTCATCATAAACTCTGAACATATTGATGCAGATCCTTAATGGCTTACTGCATGAAGTACACCTTCAAGTCAAATG
 TGTCAAATATCTTCTTCTGATATGGAAGAGTTGAACCAATGGGAAGCTGTCTCATCCATGGTCTTATCTTCTCAGGTTTGA
 30 ACGGTGCTAAGTTTAAAGTTGAATTCATTTTCCCCATTAGTAAGAGTGTAAACAGTTACCATTCTAATGATGAACACATG
 CCGGCTTCACTGCTTTACATAATGTTATGTGAATCTCCAGATAACAATGTTGATACTACCATTCTATCTTATAGATGACAA
 AGAAATCTGTTTATATAACTACTCAACAGCTGTGTCAAAGTAAAGCTTGTGTGCTGTGAGTAAATGTATGCCAGACAGTA
 TATTACATTAAATTTGGCTTTATTTGAGTGGTTTGAAGCTCCCCCACCACCCGATCATGAGGTGGTCTCTTTTCTTAA
 CTTAGACAGAGCTGTTCACTAAACAGTGATGCTTAGGATTGTCTTTACACACCTTAGGATGAGAAGCTGAAGAAGCTGGTGANN
 NNN
 35 NTCTTTTCAAGTGAAGAAATCTCATCTGATTAAAGAAATTTGGATAGTTTACTAAAACTATGATTTTGTCTCATATAGAGTTA
 AGAGGAAGAGAGCCATCCGTAATTTTATATCTGACTACACACATATAATTGAGGTTTCTAGAGTTACTATCCAGAGATTGTAT
 TTTTCTTTTCAACAATTGCTTCTGTTTGTGTTTAAATACCTGATAGTGAAGTAAACATTCTGATGGGTGTTCCAGGATAAA
 ATTTTAACTTGGTATTCCCTCCAAGTAGCTTCTAAATCTCTATTCTCATCAACAGCCACATTTTGGTGTGTGGGTTTAAAA
 40 ATCTAGAGCGTCTTTTGTCTTATAGCTCTCCAGGTCCATCTCAATGATGAGTGGGAGCGCAGAAATTTCTTACAGTCTCTCT
 CCACCTCTTCTCTATGGTCTGGTCAAGGCGAGTGCCCTGCCCTCTCTATCATAGTGGCTTCTCTTGTGCTTCAACATCTTGGC
 TTCACCACTGTATTCTTTGAGCTTACCACAGTTCCAAACATGCTAGCTGAGGGAGCCTCTTAAACGGCACTACTCTTAACTA
 CTGCTAGCTAGGTTCTGAGTCTCTAGTCTTGGTCTCTGTCACCAATAAAATCAACAAATAAGCAAAACAAACCCAGCATG
 45 GGTGACATAGTTCTCATATGGCAAGTGGGCTACCTTGACCTGGCATCCAGTTTCTCTCTATCTGCTCAACTTACAGTCCCAC
 TGCCCTCTCTCTCTACCCGCTCTGTTTCTGCTCTCTCCCAACAGCAGTTTGGCTGTGTTTCACTTCTGCTTTTCTCTCTCT
 GGGCTTTTCTCTGCTGATTCCACCCACCCACCCAGCATGTTCTCTGCTTCTCAGTTAAAGTACTGAGCACCC
 TCCAAAGGCCGATCATGAGCTCTGAATGCTCTGAAGGAAGCAGAACCTCTTCTTAAAGAGTCTTTTCTCTCACCACCAACAG
 50 CAGTGGGCTTAGGTCTCATCTTACAGATAAAGTCAAGCTTGGTGAATCAGTTACATGTCATCTTCTCTTCAAGATTATGT
 CTAAGAAAGTCTTATTTTCT
 GCACTTCACTTCT
 55 GAGTGTGGGAGAGGTGGCACAACCTTTGAATCCAGAAGTTAAGAAACCTCTGGACAGAAGAGGAGGACAGAATCATTTACCA
 GGCACACAAGCGTCTGGGGAACAGATGGGACAGATCGCAAGCTGCTGCCGAGCGTAAGACTTGGGCAACAAATATATTGATT
 GGGAGAACCAAGGATGTTGCTAAACATTCTCTGTGTGTAATGAATTACATTGAGCAATTATAAGCAATTTGTGATGATAA
 60 CAGAAACCAACTTTAGGAGCGGGCAAGAGCTTGGAGTTGTTCCGTTGGACAAGGCTAGTGACACCTGGGTGGTGAAGCCGAG
 CCAACCTTTCCGCTTCTCTCACTGTGCTCTCTCAATTTGTGAAATAGCTGATTCCATGAGTTAACGTTAGGATCAAGTGAAT
 GAATGTCAAGTATTCTGTAAGCTAAAGCACTACCTGCTTAAAGAGGAGTGACAGACAGATGCTCTCGGCTGAGGCCATCA
 65 GCCAGTTCAGCCATTACTGGTCACTCTCCCAATTAGCAATTTCCGTTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCT
 ACTGGGTGTTTTTTGGTTTTGTTTTCTGAGACTAAAAAAGCCTGTATGTCTAGAGTTGTACGACAACCTCAGGTTTTTAA
 TAATCTCAGTGTATGTCTTATTTTACCAACAGGAGGGGAAATGACGCCCTTGTATAGGATAATTATGGAACCTCACCTTTGA
 70 CCCACTGTCTACACATATATACATTGATTTTTTTTTTGTAGCTATTTTGAAGAACTACTTCACTGTAAATTTTAAATAAACAATA
 TAAAGATATCTTATTTCTGAGCTTTTGAACCAAGTGGGAAAGGATTGTTTCAAGATGGCTTATAGTATTCTCTAGTCT
 TGCAATCAATGGGGTAGCTCCCTCATGCTTGAAGAACTTAAAGAGCCATGGATCTGGTCAAAGGAGGCTTCTCTCCATGTGGCC
 TCAAGGATATACTGTTGACTTTTCTAAAGACTAAAGGGGCACTGAACCTCTCTTTTAAAAACACACATTTCCCCACCCCA
 75 TGGAAATAGTAAAAATGTTTTTAACTTAAATTTCTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCTTCT
 AAAATGGGAAGAGTTTGTAAAGCACTTGCAGTTTGAAGCTATACTAGGGGTTGAATGTGGTAGCACATGCTGTAAATCCAG
 CANN
 NNN
 NNN

422

[illegible]

CTGACTCACCTCCCCAGAACCCACCAACTGTCCATAGGTCAGTGTGAGGGTAAGGGTTTATAAACCCTCCACATCATCGT
TGATTGGTCTTGTGTAGGCTCTGTGAGTTTGTGAATGCCGTGCTCTGTATGCCAGAGACTGATTTTCTTCATCATCTCCG
AGTCTCTGACCTTAGAACCTTCTATCCCTCTTCTAAGTGTGGAGAGAGCTGTGATATGGATATTACATGTGGCTGAGGACTTC
5 TACGTACCGTGTCTCTATGTTTAAATACCTATTGACTACAGCAGTGAGTTTCTGCTTTAGCCATCATCCAGTAAACCGAGAGAG
TATCTGATGAGGCTTAAGAGCTTCACTAATATACAGGTGAAGAGATAGGAATTTAGAAGATAGATTAGTATTGTTCCCATTTAGCA
AAGTAACAGTAGTAGATTACATATGGGGCTATGAAGTGCCTAGCCATGGGTTCTTGCCCAAATTTGCAGGCATATGCTAACTCC
10 TATGAAGCAAGTCTTAAGTTTAAAGAAAGAACGGTTGGTTGCCCTCTCTGACGTTTGTGCCACCGTTGCTGCCATGGGCATATCTTG
TCAAGGGGGTCAATTATTGAGGTTACAGTGTTCACAACTGGGTAAACTGATTGGAGCTCTCTGCCCTGTGACAGCCTTGTCATGA
TGCTCTCTGGTATTGTGAAACTAGCAAGGATGGAGGACTCTTCTGGTCAGTATGAATCCAGAGAGGCAACATACCATGTAGAT
15 TTTATTGCTGAATCTTTGATTTTGTGTTTAAATTTGGATGGTCCGTATAATCGAGGAATCTGGAAAGGGTTCAATGGTGGGGAAA
GGGAAGAAAAGATCTTAAGGAGGGGAATGGTTAAACAAAGAGGAGAAAATGGGGAATTAATGGAAGGGAGGCTTAAGTGTGGGGAT
GAGAGGATAGACTAGAGGATGGGTTAGGAGACAGCAACTAACACTGAGAATATTTGGAAAAGCCACTTGGAAATCCCACTATTTTA
TAAACTGTATAAATAATGTATCCTTAATTCATCCTACAAAGGGGAGTATGCTTATTTAGAAGCTATAGAATAAAAAGCCAGTGC
20 TAGGTTCAAGGTACCTCTCCACTAGTTGTTGGTCAGAGGTGTCTTAGGAACCTGAAACAATACAGGCTACTGCCATTGCTCATGG
TATTAAGACTCTGTGTGCTGAAGACACCATGCTTCAGTCACAAGACATGGAGAAGTCAACTGGTATTGTGCTCACTTTTAGG
ACAACGTGGATGAACGTGAGGATGGTTATTTCTTAATCAGTGTGGATGGGTCCTGTAGCTTTCTCAGGTACAGTCACTGCTCT
GATGAAAGGTGGGTGGGCAGGAGTACGGAAGAGGAAGCAATACACCAAGTCAGCTCTTAGGGCAGTCAGCCTTCTCTGCCCTA
25 TGTAGAGAGAACTCAGAACTCAAGATATGGAAGGTAAAGAAAGAAACACACTTCACCCAGGTCTAGTGGGATACAGGAAGG
GATTCAAGAGATGTCAAGCAAGGTAGCTATTTAATACAGTACTGATCTTGGTGGAGAGGAAACACCTTGTCTTTTAAATGGCC
CTTTGGTTTCCAAAGCATAGAATTGACTAATGCTGTTTGTATGTTAAGCTACATAAGTTTATGTCATATTTTAACTAGCCCG
ATATTAGCCTATGTTTATTGAAGTATAAAGTGTAGCCTGACATGAGGTTGCATGCTTTAATCTCAGCAATTTGGAAGCAGAGGC
AGGCAGATTTCTGGGTTTGGGCCAGCCTGGTGTACATAGAGTTCTATATACCAGCACAGGTACATAGTGAACAATGTCTTTAA
30 AATAAGACAGAAAGGAAGGAGAGGTAAGAAGAAAGAAAGAACATTGAGAAGCTGAGAGTAAGCGTGTGAGTGTGGTGTG
GCAGTAACTATTTATATATTGAAACTCATGACTGTGACCTTAAATGGAATCCTATCAGTTTCCAGCTTTACCATGCAAGTGGT
TAGGCCTAATCTCAGAGCTGAACATGGGCTAGCACTATTTTGTCTATATTCTTCTTACCTGTGAGGGTATAGTTTTCCTCCCT
CCCCCAGTGGTACTGAATGTGGCTGATCATCAACATTCATATATGATGCTTTACATATCTATCATAAAGCTTAATCTATAG
ACTAGGCAGTAATGAGATACAGAAGTATGATAATAAATGTAATATAAAGCATCCTAATCTATGAGTGTGTTTATTCTGCATCTT
CTTGATGCTTTTGGCCAGGTAATGCACTACAAATGCTGAGACTGGTGACAGGGAGATCCACTGTTTTCCTGTACTGGGAG
35 CTTAGTTTGTGGAAGCATATGCCATTTCTAGTGTTCACCAATACTTCAATTGGATCTGATTAGGAGATCTTCCATGTGGT
ATTGGTGAGCATACTGTTCAATTTATTAATAGTCTAACTTGGATACTTCTTCTCCCTTTTACTATGAAATAAATATCTGACAAAAG
CAATTAAGGAAGGAAGGGCTTGTGTTGGCTTGTACGTCGTTGGAGGGTGCCAGCCATCATGGCGGCAGGAGCTTGAGGCAGGAC
CGGTACACATCTCCCGCAGGAGGACAGAGCAATCGACACTACTGTTCAAGTTTGTCTTCCCTTTTATGCAATCCAGGACCC
CAGTGACAGAAACAGCACTGCGGTGTTTAGAGTATGTAGTCCAGTTCAATTAAGTACAGGATAATCCCTTACACATACTCCCA
40 AAGGCTTGCCCTGGAAGTGAATCTATTTTGTCAAGTTGCCGCTCACTATCAGCCTTCTCACTGAATAAAGAACATTTTCATAGAAT
CTAAAACCTTTCTATTTGTACTTTAAGATAAATTAATTTCAATGGATCTTAGCCAAACCAATTTGGATATTTCTGACTGC
ATAGTTTTCGTTTGGTGTGTTTATTTTCTTGAATAGGCTCTTACTATATTGTGTAGCCCAAGCTATCCCCAAATTTGGGACAA
TCCTTCTGCCTTGGCCTTCTGAGCTTTGGGATTGCAAAATGAAATCACTGTGCTAGCTTTTACCTAAAACAAAGACACTATT
CCCCAAATATTTACAAGTTGACTGTTTATAAAATACAAATATTTGCCACTTTCTAGTGTAATAAATGCAATGTAATTA
45 ACCAGTTTAAATANN
NN
NN
NN
50 NNN
NN
NN
NN
55 NNN
NN
NN
NN
60 NNN
NN
NN
NN
65 NNN
NN
NN
NN
70 NNN
NN
NN
NN
75 NNN
NN
NN
NN
GGGCATCCTGCACTAATGGGTAGGGGGCATCCTGCACTAATGGGTAGAGGGCATCCCGCCACCACCTACATGTCCATCCCTTCAG

425

TTGTGCGTTTATAAAGCATTGCACTTCTTTTCTTTTTTGGGAGATTGTGTGTTTATGTCATATGTTTGTGTTTGTAGTTCAG
CCTGAATGTTTCATCGGTTTGGGCGTTTCTGACTTGGAAAGAACATTCTGTAGGTTTCTAAGTGTACAGAGCCGGAACCTGCCTC
GTGGTTCCTGGGCTTCAGGGAAGACAAATATGGAAGTCAACAGCCAGTTTCTGCGTTGAGAGCATTGCAAGAAATGCTGGCTTGA
ATTCTGAAATGACAGTGTATCTACTGCTTGTAGCAAAATAAGCTATCTCTTATTTTACATACTTCTGATGTCTCTCGATTCT
5 GTGATTTGGGGTGGTGGTTACATATTCGAGGAGATGAGACAACTCAAAATAATCTTCACTTTAAAAAAAATGTGCTTGCCATC
TAACTTTTCATGAGAGTTCATCGCACTTCAGGGAACGAAAGACAAACCAAGTAAGTCCACAGAACCCTCACAACGACCGTT
GAGGGGCTCTTCAGCCTGTGCAACAAAGGGCACTGAAGCTCTTTAATTGAAACAATGCATCTAGAAGTAATGCTGGTATCTG
10 AGTTAGGGAGATGGCTCAGTCTGGAATGTTCTCTGCAAGAATAAACCTGAGCCGGGCGTGGTGGCACAGCCCTTAAATCCAG
CACTCGGAGGAGAGGAGGAGGAGGATTTCTGAGTTCGAGGCCAGCCTGGTCTACAGAGTGAAGTCCAGGACAGCCAGGGTTACACA
GAGAAACCTGTCTCGAAAAACAAACAAACAAAAAGAAATATAAACCTGAGTCCCATCTCCAGAAGCCCCACAAAGCCAGACAAG
GCATCCATGTCTATAGTCCACAGACAAGGCGTCCACGTCTATAGTCCAGTATTCCTGTGGCAAAAAACGGGAGTTGAAGATG
AAGATTCTCGGATGCTGGCATGACCCAGCAACCCACACAAGAAATGGCAGAGAGCTAAGAGATGCTGTCTCAAGACAAGGTTTG
AGGGAGAACTGATAGCCAAGGTTGTTCTCCATAGAGGACATGTGGCATGATATGCCCGCCTCCACCATGCACAGAGGCTCG
AGAATTTAATCGCATATAGTAGGCTGTGAGAACTGAAAGGTCTGCTCATGGAATAGGAGACTCTGAGAGATGCGATGAGCCC
15 TGGTGTAGCAAGGCTTCTCTTCTGCTTCCAGCCACTCTGATGCAAACTGCTCCATTTCCCATCGTAATGGGCTGACATCTC
TGAATCTGTCTTCCACAAGCTGCTTCTATTTTATCAGAGTGAAGAAAGTAACAAACACAGGTGTTCCAAATGGTCTATTCA
GTGTTCACTATCCCTTGCAAAATACTGATTGATTCTCACAACCTCAAACTCCAATTTGAGTTTTTATAAGCATAACATA
GTTGGTGTTCATCAAGCCAAGGATATGATAGATCTAATGACTAATCTTCAGAGCTATTTTATAATCTTGATCTCTGGTGAACAATA
20 CATTTCTGAGTGTGAGTAGTATAACTGATGAGTAGCTTTTGCAGAAAAATGGAGCCTGTATGACCACTTAGCTCTCAGTGAG
TCAAGATTATGAGATGATGAATGTGACTAGCAACGAGGAGCCTAAGTGTGTGGTTTCAAGTGGCAGGCAAGAGCTGAGCATGTGA
TCCCTCTTATAGAGGCTTCGACCTCTATAAACTCTTACCTATATGTAATCATAGTTATATGGCAGGCAACTGGGAATGGCTGTT
TTACTCCAGAGATTTTCTAGTGACTTTCAGGAAGGCAAGTGTGATAGGTTTATAACACAATGCTTTAAAGTATATGTTCTCTAG
TCTGGGTGCTAGAAAGTCAAGTTCAGTAGGTGGATTAAAGTCTGGCAGAGCATACTTCTGTTTCGTAAGATACGATTTT
25 GTTGTGTTTTCTGTTTTACATGACAGAAGGCCCTGGTTTATTTTGTGATTGGGTGGGTAGGTAAGTGGGTGGGTGGTTGGTG
GGTGGGTGGGTGGTTAATGGGTGGGTGGGTGAATGGTTGTTGGTTGGTTGGTTGGTGGGTGGGTGAATAGCTGGTTAATGGT
TGGTTGGGTGGGCGGATGGTGGTTATTGGTTGGGTGGGTGGTTGGGTGGGTGGTTATTGGTTAGGTGGTGGTGGTTGGTGGT
TTGGTTGGTTATTGAAACAGGGTCACTGTAAACCCAGGCTGGCCTGAAGTGTGTTATGTAGCTTTGAATGGTCTGAATCCCTG
AATCTTCTTATCCAATTTCCAGGCGCTGGGATTATAGGCATGGGCCAGTATACCAACTCTTGCTAGTTTACTTTGGTTGGTTGGT
30 TTGTTTCTGTTTTAGTGACCTACTCTCTGTGACACATGACAAATGCAATGGATGTACTATATTACTTAAATGAGAAGCT
ATTCCAATGTCTATAAAGTGGCATGTGAGGAACAGGAGAGACACTGAGAGGACCAATACTGTCCACTGACCTCATATAGGACTG
GTAGATGCGAGTGTGTCTANN
CTGATCTGAAGCTGACAAAAATTTGGTTGTAATTCAGACTTTACCATTACCATCGTTGTTGACTTCACACAAGTTTGAATGCTCTCTAA
35 GTTCATTTTACTTATATTGGATATCAATATAGGTATTATGAAGATGTTGTGAACAGGAAATCCATTATGGGTCTCTCTTAAGA
TTCTGTGGCAGCTGCGGTAAGATGCTTTGCTAGTTCATCTGTGCAACAAAGAACTGTGTGTGCCATTGCGTATGAGGAATGAAA
GATTTCTGAGGCTCATGTCCCTGCTTGAAGTTACATGTACTCAAAATAAAATATTCCTTCTAAATTTCTCAGTTTCTACAGT
AGATAAATTTCTTATGTAACATATATGCAATGACAGCACAGCTTCCCTTCAACCTCTTGGTTTCTAGTGAGTGTATCTTACA
CACACTCGTTCTCATCCATTGCCGTTCTCATCCATTGCCGGGGGGTATATCAGCAGGAGTGCAGGTTGGCTAAGTGCTTACTGCA
TCTACTGTCAAGGAGGAGGTGACCTGGTTCCAGCAGTGAGAGTGAGAGGCGAGGGCAAGATAGGAGGCTGTGAAGTGAAGT
40 TGGATCTTGTCTTGGCATGAGGGGGTTATTAAAGGCTTTTAGGTAGAGAAATAAATGATTAAATTTATCTGATGTATAGAA
ATCCTGTTCAAACCTTTTATTCATATAGTATAAAATTAATCTCAGATTAGTAGGGAGAGATGATCAGAGTCCAAATTCATGTC
CAGTTAACTTATTTTATAGCATGTTTCTGCTGCTAATTTCAGAAGCATGCATTTTAACTCTAGAAAATCTAAGCTGGGGGGG
AAAAAAAACCAACTCAACTTTGATCTGTGCTTCAATGAACTCATTTCAAGTGTATATAATCCATAAAGTAGAAATGACTCAGGA
45 AGAAACGATTGCCAGAACACTTTCTCCTTTAGAAGTGGGACTTTTCAACCATTAATTTCTCAGACCTTCTCTGTAAACCTCC
CACTGAATCATATGTTGCTAATCTTGGTTCTTTATGGATATTTTATGAGTATTTTGTATTCACTGATTAAAGGAATCTTTCCAG
CATTTGTTCTGGAAGAAATTTCAATGATGTTTATATTGTAGTCTACCTTTCACACTAGAACCAACATGATCAGTGGGTCTTGGGT
TTTATGGACACAGAGGCTAAGAACCTGTTAGATTGAAGTTAAGTCAGGAATGCGTCTGTGTAACTCTGCATCCCATGTTTGA
CAGCACCAGAGTGAATCCACACAGGAGGACTGAGGGAATGAACACAAAGACCCGGTTTGTGAACAAATTTGCAACCTGAGCT
TCTATCTGACCTTCCGCAAGCCTTACCCGTTTCTATTGAAATGCTCCATTGGTCTGCAACAGAACCTTAGAAAATCAACCCAC
50 AGCTACAGGGTTTCTTAACTCTAAGGATTTAATTTGTTACTAGTGTGGTAAATAGGTCTTTTGTCTGGTGTTTACAATTGCAGG
AAGCATAATTTTCAATACACTTGGGTCTCTCTTATCATATGGCTCTGTTGTCCGCGTCCCATCAAAAGGGAATATACATCTG
ATGATAAATCAACTAAGCAAGCAAGCTGTGTTGACAGAGATTTCTATTTCGAAACCAAGGCTGCAATGAATCTGCTATCTCC
TTTGTGCTTAAACCTCTGAGCTTTAGGTTTCCGTTCAATGGAGGAAGTATTTAATCCTGTATATAGTTACAAAGCATACAGAA
TTTCTCAGATCAGAGATAAACAACAACTCAAGGAATGCTCAGTAGTCCAAAGCCATTGGAACACACAGTGTGGGCTGCGAGATTT
TAGGTCAAGAACCCCTCAAGATGAACCTACTATGCTTGGAGAAATATGTAAGGACAGAGTCAAGGTTGTTTTCATTGACTGAT
55 CTCTTTAAAAACATAAGTGTTTTCCCACTTTCTAATAGTACTAAATATATCTGACCATGGATGGAGCAACTCATCCAGCTAGTAGG
GTTAGAACCTACCACTCATTTTTTCCAAAAATCTTTTTTATTGAGCACTTCCAATGCAAGGCCGAGTTCAAGTGTATATAC
AGCTCACAACATAAAGTACACACAAGTATAGTGTGTACAACATTCAAAATATAGGCAGGATCATTTTCTGGATACCCCTCGA
ACATATGAAGGAAAAAATAGGCTTATCTTTGGTAACTATGTTTCTTAAAGTCAATCTGCTCACTGTTTAAAGTAAACCAAGAACCA
60 GAGGTTAGATGGACAGAGACCTACAGTAAGAAAGCATAAAGATAGTGATAAAACGACCCCTAATGATATCTGCTATAGTCATA
GATCAGTGGCTCTGTTCAAGCATCAGAGAAGCTTCTCCACAGCAGATGGAAAGAAATACAGAGACCCACAGCCAGACATTACAC
ACAGAAGACCTTAGAACACTCAGCTCCAAGTGGGATGTCTCCATCCATCAAAATCTCTCCCTCAGAGCTCAGGGAACCCCCCAC
ACACACACACACACACAGAAGAGGAGGAGGTAAGAGACAGAGGAGTGGGCCACAGGAAAAACAGGACCTTTAAGTTTACA
TGAACAAAGCAGATATGAATCAGAGACTTAGCAGCAAGCAGTGCCTATACAGCCTGCACCAAGCTCTCTGTGTATATA
ACGGCTTTCAGTTTTGACTTTTATGGGACTCCTGTCTGTGTTAAAAATGGGTGCTGATTCTTGTGCTTCCCTTGGGCTCTTT
65 TCTTCTGTTATTTTATCTGTCCAACATCAATGCGATGGTGTCTTTCTTATTGTGTTTATTTTGTATATTATTATATCATC
ATCATCTAGAAGCCTATTCTTTCTCTGAGAGACAGGAGGGAGTGGATGCAAGCGGAGCGAGGACAGAGGCGCTGAGGAGC
ATGGGGATGGGAAATGATCATCACTAATCTGTATGAGAGAAGAACTCACTTTCAATTAAAGTGAAGGAAATCTAAGATGTCTC
TTTTAANN
70 NNN
NN
NN
NN
NN
75 NNN
GGGAGGGCTGGGCGCAGTGGGCTGCTTACTGCTGCTTTCAGGCTCTATCTATATCCCTGCTCTGCTTCTGCTTCTC
ATAAGCCAGTGAGCAGTGTCTCTCCATAGCCATTGCTTACTTCTGCTTTCAGGCTCTATCTATATCCCTGCTCTGCTTCTC

TGAAATGACAGTGTATCTACTGCCTTGTAGCAAAATAAGCTATCTCTTATTTTACAT

MOUSE SEQUENCE - CODING

encoding71kmybprotein, completecdsATGGCCCGAGACCCGACACAGCATCTACAGTAGCGATGAAGATGATGAAG
 5 ACATTGAGATGTGTGACCATGACTACGATGGGCTGCTGCCAAATCTGGAAGCGTCACCTTGGGGAAGAACTAGGTGGACAAGGGAA
 GAGGATGAGAGCTGAAGAAGCTGGTGGAAACAGAACCGAACAGACGACTGGAAGTCAATTGCCAATTATCTGCCAACCGGACAGA
 TGTGCAGTGCACACCGGTGGCAGAAAGTGTGAACCTGAACTCATCAAGGTCCTGGACCAAGAAAGATCAGAGAGTCA
 TAGAGCTTGTCCAGAAATATGGTCCGAAGCGTTGGTCTGTATTGCCAAAGCACTTAAAGGGGAGAATTGGAAGCAGTGTCTGGGAG
 10 AGGTGGCACAACCATTTGAATCCAGAAGTTAAGAAAACCTCTCGACAGAAAGGAGGACAGAATCATTTACGAGGCACACAAGCG
 TCTGGGGAACAGATGGGCAGAGATCGCAAGCTGCTGCCCGACGAGTGAATAATGCTATCAAGAACCACTGGAACTTCACCATGC
 GTCGCAAGGTGGAACAGGAAGGCTACCTGCAGGAGCCTTCAAAGCCAGCCAGACGCGAGTGGCCACGAGCTTCCAGAAGAACAT
 CATTTGATGGGGTTTGGGCATGCCTCACCTCCATCTCAGCTCTCTCAAGTGGCCAGTCTCTCGTCAACAGCGAATATCCCTATTA
 15 CCACATCGCCGAAGCAAAAACATCTCCAGTCACGTTCCCTATCCTGTGCAATTGCATGCTAATATAGTCAACGCTCCCTCAGCCGG
 CTGCGGCAGCCATCCAGAGACACTATAACGACGAAGCCCTGAGAAGGAAAAGCGAATAAAGGAGCTGGAGTTGCTCTGATGTCA
 ACAGAGAACAGAGCTGAAGGGACAGCAGGCATTACCAACACAGAACCACACTTGCAGCTACCCCGGGTGGCAGCAGCCTCCATTGT
 GGACCAGACCAGCCTCATGGGATAGTGCACCTGTTTCTGTGGGAGAACACCATGCCACCCATCTCTGCTGCAGATCCCC
 GCTCCCTACCTGAAGAAAGTGCCTCACCAGCAAGGTGCATGATCGTCCACGAGGCACCTTCTGGACAATGTTAAGAACCTCTTA
 20 GAATTTGCAGAAACACTCCAGTTTATAGATTCTTCTTGAACACTTCCAGCAACCATGAAGCTCGGGCTTAGATGCACCTACCTT
 ACCCTCCACTCTCTCATTGGTCAAAAACGACACCATGTGAGACCCAGCTGTGAAACCCAGAAGGAAAATCCATCTTTAGAA
 CTTCCAGCTATCAAAAGGTCAATCCTCGAAAGCTCTCCTGCACTCCCAACCATTCAAACATGCCCTTGCAGCTCAAGAAATTA
 TACGGTCCCTGAAGATGCTACCTCAGACCCCTCCCATGCAAGTGGAGGACCTCAAGATGTGATTAAGCAGGAATCGGATGAATC
 TGGAAATGTGGCTGAGTTTCAAGAGAGTGGACCACCGTTACTGAAAAAATCAAGCAGGAGGTGGAGTGGCAACTGAGAAATCGG
 25 AAAACTTCTCTCTCAAAACACTGGGCAGAGAACAGCCTGAGCACCAGCTGTTCTCGCAGGCGTCTCTGTGAGATGCCCA
 AATATTCTTACAAGCTCTGTTTAAATGACACCTGTATCAGAAGATGAAGACAATGTCTCAAAGCCTTTACCGTACCTAAGAACAG
 GCCCTGGTGGGTCCTTGCAGCCATGCAAGTGGTCCCTGGGAGCCAGCATCTGTGGGAAGACAGAGGACAGATGACGGCCTCCG
 GTCCGGCTCGGAAATACGTGAACGCGTTCTCAGCTCGAACTCTGGTCAATGTGA

HUMAN SEQUENCE - GENOMIC

TTGAGAAAAACATGTAAACAGTGTGAAGTAAAGGTATCTTCTTTTAAAAAGTATTTTGCATAGATATTGTTCTTTAAATGTTCCA
 30 TGAGGATATCCTTAACCTACAGTTATTTAGAAGAAAGAAAGAGCAGCAAAAGAGTTTCAAAGAAAAAAGTATATGCAATCTA
 AAAGCCAGCTAAGGTGCTATGCACACCTCTAAGTCCCAGCTGCTTGGGAGGCTGAGGCAGGAGGATCACTTGAGCCAGGAATTC
 AAAACCGCTTGGGCAACATAGCAACATCTCATCTCAAAAAAAGAGAAAAAGTTATCAAACTCCATGTAACTAGATTAAAC
 ATAAATAGAAATTTATACATATATCAAAATGTCAATTTGTTCCCATAAATATATACACTTATAATTTAATTTAGTAAAG
 35 AAATAAGAGCTTTTATATCAGATTGTTGGTGTACCTGACATTTTCAAACAAATTCGCTTTTGGGGCCAAAGTGTCTCTGTCA
 AGCTCCATACTAAAGGATCAAATGAGCCTCCCAAGCTCCAGCAGAACTAGCACTTTGGAACCTTTGTCAAATTTTAAAGCAAAG
 GATTATAAACACTTTGATATAGTTTCTTAGAGGCTGAATGTTTGTCTTAACACAAATATTAAACCAAATTAAGATAACTCAAG
 ACTGATATGTTTCATAAACTGATTGTTTTATTTTCTCAGAACCGTTACCTTAAGTGAAGAGTAAATTTGGAATTAAGCAATTTCTA
 TAGATGTCAAACCTTTGTAATTTGATTTTTTACATCATCCAAACCTTTGTATTTCTAGCAACAAATGTAAGAAAGAGTAGAG
 40 TTATGGTACACTTCATCCTAACAGGGTTACATTTAAATCATGTAGTCCACTTCTGTGAAGGGCCCAAGAAAAATAACTCCCTTA
 AATCCGTCTCTTCTTCTGTTCTGTTGAGTTAAACCTTTATTTCTTAGACTTTGGTTAAAAAAGAAAAAAGAAAAAACA
 GAAAGACATAGTGGTGAATTAAGAAACATGCCATTTCTACCAATGGTTTTCACAAAGCCTAAAAAACCTACAGTTGCTGGAAT
 TAAGCACTCATTCACTTATTGATTTTATGATTTTAAATGATTTTAAAGTGGATGGCCCATGAGGTAAATTCATATTTAAGATGTAG
 TAAAGTCAACATCAGATAAATATACAATGATAAAGTAGGAGAGACAGAAATAGATTTCAGAAAAATATATGTGAACATCATGC
 45 TTTAAAGAAAAACAGTTCCAAAGTCATATTGCCAAACAGACAGAAATCTATCAAACTATAGAAATTAAGCACTACAAGTAAAGT
 TAAATTTATGATTTTGTCTATCATTTGTAAGGTTTCAACCTTTCTGAGGACAGAAATGAAATCCCTTTGAAGGACTCAATACA
 GGAAGAATTACAAGAACATAAAGGCATAGGAGTTAAAGTTGAAGGCTGCCAGAGAGTAGCGGAAAGAACTTTGGATTGGAACAA
 AAAACCTTCATTTAAACAGTCCCAGCTCTGGTAAATGTTATCTGTGTGACCTTGTGCAATTAACCTGCTTCAATTTTCAAT
 TACTTGACCTGGAATTGAGGAAATAATACCTGCGGGGAGACATAGGCAGAAAGGCATGAACCTGCTGTGAGGATTAATGATATA
 50 ATATATGGCAGACCTGTTGTAATCTTAAGGCCAAATATAACGTGCTAATAAGTATATTAAATAAAAAATAAATAACAGCTCC
 AACTAGTTCTCATCAGTTGTCTCAGCACAACAAAGATTATGTACGTACTTATGTTCAAGACCCCGTCTAGGAAGTGAAGT
 AGAAAGGTAAAGATACTGTCTCTCTCTGACCTATAATGAAGGCTCCAGATGAAATAGACACATTTATAAATAGATAGATAG
 ATAGTCTTAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGAT
 55 TAGATAGATACATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGAT
 ACACAACCTCAGGTTGGGAGAAATGACTGTGGATTAGCAAGGTCCAAGAGGCTTCAAGAGGAAGATTGGACTTCAGCAGGGCCT
 GAAGAATGGGTAGCACTTACATAAGCAGAGAGGAAAGGAGGCAATGCAAGGCAGGAGGCATGCTTGAACCAAGGCCTGAGAT
 TGCCAATGGTTTTTGGGGGAGGAAACAGAGTGAACAGAGTATGATAAGAGATAAGGCTGAAAGGTAGGTTGTGTTCTAAGGCAAA
 ATGGCATGCAGTCAGTGTGCCCGTCAAGCCTGCAGGTTGTCTATAGCCAGGCCCCTCTGATTGGCCAAATACATGAGCCACTTCA
 60 GGTATTAATACTACTACCCCTGGGGTAAAGGTTGTCTGGGCACAGAGGCCAGAGCAAGCTCAGTATAGGGAATGCCAAGTTAAGG
 AGTTCAATCTCTATCTTGTCAACATTAGGGAGCCAGTTAAGGTTTAAACAGATGACTAACATGCTAAAAGTGAATATAATGA
 GATTATTGAGCAGTGGGATGCAGAAATGATGGGGGAAAGTGGCCACAGGTTGGAATTAATAGGGGGCTGTTATGGTAGTTCA
 GGGTGAAGTAATAAGCCTAGAAGAGGTGGTGACAAATAGAAAGAGAAACAGGCCCTGAATGTGCAGGAATCATCTAGTAAAG
 65 TTCCACTTCTTCTTCTGCAAGGCCAAGCCTTGCAAGTGCACCACTAAGTAAACATGTGTTTATCAACTATAAGGAACTA
 TGGAAACATTGTGAGGATACAAAGGTAAATGAGAGCCTGAGTATTTAAGAAAGAAACAGAAATTTAAAGACTGGAACATTTT
 TAAAGATCTCTACTGCAGCCTCCATGGATTGAAGTTTGAATATGAGGCTCAGAGAACTGTGTGCTCATACATTTGATGAA
 CTTGCCCTTTGGGAGGCCAGGCGGATCAGAGTCAAGAGTCAAGAGTCAAGAGTCAAGAGTCAAGAGTCAAGAGTCAAGAGTCAAG
 70 ACTAAAATACAAAATTAACCTGGGCGTGGTGGCAGGCGCATGTAATCCAGTACTCGGGAGGCTGAGGAGGAGAAATGCTTGA
 ACCAGGAAGTCAGAGGTTGCAAGTGAAGCGAGATCGTGCCATTGCACTCCAGCCAGGTGACAGAGCTAGACTCCGTCAAAAA
 AAAAAAGAAAGAAAGAAAGAAAGAAAGAAATACATCTGTAAGTAACTGTTGAAGAAATTTCCCGAAGCTTTAAAGAGATAGGAC
 TGTCACTTGGAGAAAGTTAACGATTCCATAAAACAGATATTCTAAAGCAGAAAGAGGTAAAGACCTTCATCTCTACAGCAATGTT
 75 TTTCAGATTGCGATCTCACTACCTATAACAGAGCAGCAAAACAACTTTGGGATCCTGACAGAAATGAAGAGAGAGAGAGAGAG
 GTCTCAGATTGCGATCTGGTAGTAAGGGTAAGTATTGTTTGTGAAGCTTTAAAAATTTATTTTAAAGGACAAAGGTTCA
 CTATGTTGCCAGGCTGGTCTCAACTCTGGTCTCAAGCAATCTCCACCTCGGCATACCAAAAAAGTGTGGGATTACAGGTG

429

430

[illegible]

ACCATTTTGGTTTTTTTCTATTATTTTGTAACTATATTTTCATATTTTATAATTTTCAGACATGATTGTGATGATGTTTCAGTATA
TACATGTAAAGGTTATATATAAAACCTCTTCATAAATAACATTAGCTGCTCTCTTTTATTGTCATGTGTGAAAGTTATGTGGGCC
ATTACTGAATTTCTGACATCTTTAGCGACTGGGCAGCCAACTGGGATGGCTCCTTGTGCTTTGCAACATACATAGTTAAACCAACA
5 GACAAATAAAGAGAAGTGATGCCAGTAGGTATCTTAGGGTAAATTTATTTTGTAAATAAAGATGTTTATGTCACATG
CTAGTTCGACCCTTTTAACTTTAGTTAATGTTTTCGCAATTTCTCCTGTTGTGTGCTACTGTAAGGAGACTTCTGTTAATTT
GCTCTCTGCTTTCTAACACGTTGATTGGCAGTGCTTCTGTCATCAGTGCAATCTGTAGCATTAGAAAGGGATAGAAGCAAC
AAGAATATGTGTAGATCAAAGCAACTCTAACTCCTGAGTCTCTAGCTTTTGTGGTTAGAATGCAATAGGACAGTTCTTCAGT
TCTTCACTCACAGCAAGCATTATGGACCTTTGGCAAATATATTAAAGTGGAAATTTAAGACAATATGATAATTACTTCGAAA
10 TATAGACCTATGATTTGACATTTTACAAAATGATAACAGGTAATCATATAGGTACAACCTCTAGCACTATTAACCAACAGGGTCT
TGCAATGATAAAAGGAAACATCTTGACAACCTGTTTCATAGCGTAAGTTTGGGATGATGCAACTACTCTTATCTTCTCCCAACAG
CATCTGATACCTTGTGCAACTTCATTGCTAAGTTCCTTCTCCCTTTCTCTGCTCTCTCTTATTCTACACCTTCCCTCTCTCT
TAGACACAGAACACACATGTCAGCTACCCCGGGTGGCAGCAGCACCACCTTGGCGACCACACAGACCTCATGGAGACAGTGACCC
TGTTTCTGTTTGGGAGAACACCCTCCACTCCCTCTCTGCGAGCGGATCCTGGCTCCCTACCTGAAGAAAGCGCTCGCCAGCA
GGTGCAATGATCGTCCACAGGGCACCATTCTGGATAATGTTAAGAACCTCTTAGAATTTGCAGAAACACTCCAATTTATAGATTCT
15 GTAGTAGAATTTGTGAAGGGAGTTAAGGATTCTGGAAGATAAATAGAAAACCCATTCTTAAATCATTGCCATTTCTATAGCC
AAGCTGTTATTAGCATATATTAATGTAAAGGTAGAAGTATGATTTTCATCTTCATGAATATGTTTTCAGAGATCTGATTTT
GCCCTACCGAGAGAGACAAAAGTATTTATAAATCTTACAAAATAGGACTTTTGAAGGAGAGTTTTCATGATTTTTCACATTT
TCCTTCAAAGTCTATTTTTTAAATAGTCAAGATTGATGACTTATAAAGCAGAGCTTGGATTATGGGAACCGAATGGTGTGAG
TACTTTTTAACTTTTTTTTCTTGTCTTACTTCATGGTCTCTCTAGAAATTTGTCTGCTTTTGAACAGCACATTAATGATT
20 GGCTTACTCAGAGCTGAAAGCAATCTTTAGTGTATTGGAAGTAATAATCAGCTCCTTGGTCATACCTGGCTTTCCACAAAATG
GTGATTATTGATTACTGGTCCCATGCTTCACTGAGATGAATCATCTTCGTGAACAAATTTGTATTGAGCACTCTCAGCGAA
CACTTGGTCTCTTCCAGTTGATTAAAAATCATTATTGTCACACTCATTGGTTAGGAGATGACCATTGCCGTAATATGCCATCTA
GAAAAGGTCTTCATTTTGTCTTCCATTGTCATGTCAGATGTCAGGAGTGTGCGGAGGTCCTGCGACACATCAGAGGCGCAGCTTGAAG
CAGCCCACTAGACCTGCTCTACTGCAGTATAATAGAGCAACTGCTCATCTGAAGCTGTGCTCAAGAAGCCAAACCAAGCGGCC
25 TAGTGTGTGCTTTGCGTTGACATCTCTCTCAGTGCTGTTTTCAGGTGATGATGGCACACACTATCTCAAAGTCTGTGCTCTCC
ACATGTTTTCAGGATTCTTCTCATGGTGTGATCTCAGCAGTTTGAATTTCTTGAAGAAGCAGATTTTTCACCTGCAACATCA
CACAGGCAAGCCCTCAGCTTCAGCAAGAGAGGGCAATGGGACTAACTGCAGGAGAACCTAGCCCAAGGGTGAACAAACGTA
TGTTGAGTGAGAGTTCACTTGACCCACCAAGGTCTTACTCTGCAAGGCACAGCAAAATCCACTGGTCTATCTTCCGAAAAA
CGGGGCCAGGCCAGCCCTTAGCCCTGCGAGGTAGAACAATTTCTGCACAGCTGTTACTCATTTTCAACAGACCTGAGCCTT
30 TGTCAAAGCCTACCCCTTCTCTCCCTGCGAGGTAGAACAATTTCTGCACAGCTGTTACTCATTTTCAACAGACCTGAGCCTT
AATAATCTAGAACTAATACTTCGGAACAAATGACTAATTAAGTCTGCTTGTGATTTCATTCTGTGTTGAATCTAGCTGTTG
CTAAGTTACTGCTCCCAAGTTTAGGCTGCTGCGAGGCTAAGTGTGATTGTTGTCATCATTCTCTCTTCTTACTTTTGGTG
TGATCCCTCCCTTTAAATTTGTTAATCATTTCTTCTCTGTTGTTCAATTTATTCTTATGCGATTCACTGACCCAGGGAGGAGGG
35 AACCAAATTTGTTTATATAACATTTGGGTTGCACTAGAAAATTTAAAGCTAGAAAATTTAAAGGTTCCAATTCATCTTAAATG
GAAGAGTTTGGGAAGGATGAGAAACAATGCTTAAAGGAAAGAACATATTTTAAATTCAGTTTCTCAACATTTGGCTTTTGA
GTTGTGCCATACTATTTTACTAGTGAGTTTGGCAAGGAATTTTATTTTATACAGCTTTTAAAGGATGAAATCACAAAT
TCTTATCAGAGATTGTGTTCTTAAATTTTAAATTAATTAATTAATAGATAATTTGGCACTTTAAACATTTTCCAATTTGAT
40 CTGTTGAATTTGTTTAAAGAACAGATTAGGTATGATATAGGTATATACATTTGGGAAACACTGAATCAACAAAGTTACAAGTAG
GTTTCTAGCTGGGCATAGTGGCATGGGCTGTAGTCTAGCTACTGGGGAAGCTAAGGCAAGAGGATTGCTTAAGCACAGGAGTT
CAAGTTCAGCTGTGTAACATAGCGAGATCCCATTTCTTAAACATTTCTTTTTTAACTGCAGGCCCTTCTCAGAGTTATTAA
ATGCGGTGTGCTGTGAATTTCCAGGAGGAGATTGATATGTTGTGTTTCCAAATTTATTTTACCTTGAATTTGTTTAAAGA
ACACCTAGTTTTTCCAGAACTTTAGTGTCTGAGAGACACAGTTTATTATTCAAGAATTTTCCATATAATGTAACCTTCTGTA
45 ATACTAATTTGGTTTCATAGATTATTAAGAGAGAAAAACAAGTATGAAAGGAACTATTAATTTAATCTATTTTCCCAAAA
ATCACTAAAGCCTTTTAAATGTTTAAAGAACACATCTCATTCTTTAATGACAAGTGTCATTATTAGGAGATTCTTCTCACA
GTTTGGCAAGTTTTTTCAGCAATGACCTTAAATTTTATTCTTGGAAACACACCCAAATCTGGGTGCTCAATTGAAATAAACAA
TACCCTAGTCAATATAACATGCTTGTAGCATCTTATTATTATTAATATAGTGGGTGAGGAAACATTTCTGTTATCTAGGTGTGAT
50 ACCATGAAACCTCAGACTTGGAAATGCCTTCTTAACTTCCACCCCTCATTGGTCACAAATGACTGTTTACAACACCATTTTCA
AGAGACCAGACTGTGAAACTCAAAAGGAAATAGTGTGAAGTCTTGGTTTCAAGAAATAAATGATTATCTTATTACTTATAT
TTAATTAATGGAATATAGTTCCAGATGTCTGATCCACTGTATGTGCATAATTTTACTGACCAATTTATATAATCATGTCTATT
CCCATCTAGTAAATATCTGCTGCGGATATTACAACTACCTCAGGTAGAAGATGGGAAGATAAATCAGGATCTTCTTGAACCT
55 ACTCCAAATTTCTATATATGACAAGTAGTTTTCATAAACTTTTCCATTGCGTTTGTGTTTCCCTCCATAAGGCTTCTTAT
GAAAGCCAGATTTTCAACCTCTTCTCTCTAATTTGAAGCTTCAGAATAAGAACAGATGTTTCTTACCTAGTTGTATTTT
TATTTAATTTTATTTGTTTATTTATTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
60 GGACCTCTCTGACATCCCAGGAATATTATGATTAGAAGCAAGGGATGAGTAAGCAGTCATTTTATTCAATAAAGCCTTAA
TCAATTCAGAGAAATGTTAGAGAAAGTGTGAATTTATCAGAACTTGAAGAAAGATGCACTGTTATTTCGAAGTACAAAAGTAAA
TTTTAAAGTTTAAACATGTTTGTAGTATGGGCTGTGTTTTCATGAATAGGGAACCTGATTGTGAATGACATCAGGTCTTCTG
ATGCTCATAGTCTTATACAGATCATAGGCACTACATGTGCTTTCAGAGCCATTAAAGGAAGATGTTAAATCATTATATGCTTTTAG
TCTTCGAGGTATAATTTTGAATATTTGAAATATGTGATATGCATATTTCTTTTCTTAAACGAATAACGTGATTATTCAGCA
65 CACCCCAATTTCCATATCCGGAACAGAGTTTATTTGTTTATTTAGTTGTTTATTTTATTTTATTTTATTTTATTTTATTTT
ATTCTTTGTTATTTAGCCACTGCTGTTTCTTTTAAAGTTTGAAGCCCGAGCTATCAAAGGTCAATCTTAGAAAGCTCTCCA
AGAATCCTACACCATTTCAAACATGCACTTGCAGCTCAAGAAATTAATACGGTCCCCTGAAGATGCTAGTAAGTTCTAGAAAAGT
TTTTGGATTTCATTGGTTTATTAGTCCCATTAGGAGTTCTCTCTGATGCAAAAATACCCACTCTCCGTTTAGCCTCAGACCCCT
70 CTCTCTAGTAGAAGATCTGAGGATGTGATCAACAGGAATCTGATGAATCTGGAATTTGTTGCTGAGTTTCAAGAAAATGGACCA
CCCTTACTGAAGAAAATCAAACAAGAGGTAACACGCAACCTTTGGAAGCAACAGCTGAGAATCTGCCCCCTTTATCTCTGT
GTGCACTGTGATGTGCTGCCATTGGCACTGTGCAACACCAAGCTTTTCTGTCAGATTTTATACAAGGTGAGCGAAAAGGTA
CTGCCAGCTGTAGGCATCATCAACCTTTCTTTGGGAAGCCCAAGCATCTATCTACTCTCATGTTTGGACAGAAAACATACAG
AGAGTATCAAGAAAAGGGAGGAAAGAGGTTTTAATGTACTTTTAAACATTACTGATTATATAAAGTTGATTTTCAATTTTGA
75 TGTGAAGAAATTTGAATTTAAATTAATAGTATCTTAAATTAATTTGATTTAAAAAAGGGAGGCTGGGCGCGGTGCTCATAC
CTGTAATCCAGCACTTTGGGAGGCTGAGGTGGGCAGATCACAAGGTGAGGATTCAGATCATCTGCTGTAACATCTGGTGAAACCC
CGTATCCACTAAAAATACAAAAAATAGCTGGGTTTGGTGGCGGCGCTGTAGTCCAGCTACTCAGGAGTCTGAAGCAGGATT
ATGGTGTGAACCCGGGAGGAGATCTTGCAGTGAGCCAAGATCTGACCTGCACTCCAGCTGAGGAGACAGCAAGACTCCGCTC
AAAAAATAAAAAATAAAAATAAAAAGAGAACTGCAAGGTCAAGATTTTATGCTTGTGGCAACAGCTGTTTTCCACC
AGGTATAGATACAGTCTTCTGAATTTATTTCTATGTAAGATAGTATTTTTTTTATAGCTAAAAATCTGATTGATTATTTAG

5 TAATGGAGAATTTTACCAGAATGTGATTAAAAACCACTCTTTGTGTCACCAAAAGATCTTTATGTACCAAAAATAAAATCCTTGAC
 GGATACAACTACTAGGTGTATCATTAAAAATATATTCTTAATAGAAATAAACACCTAGAATCAGAACATTGGTTGAAAACGTAGGA
 GCTTTACAGGGGAGTAAATTTGGAGCTAGTCACATTTCAAATTTGCCATCAGTGTTCTTTGTTGAATCCAGAAGATAGAGCAAA
 10 TTGAGCTGTATAGTTAGCAACATAGTTTATAAAAGTATTTGAGGGAGTGGCCAGAAATATACTCTGACTGTACATGTTT
 CATAGGAAGTTCTAGAAACAACAAAGCACTTTCTATATGCTTTTAGGTGGAATCTCCAAGTATATAATCAGGAACCTTTCTCTGCT
 CACACCACTGGGAAGGGGACAGTCTGAATACCCAAGTGTTCACGCAGACCTCGCTGTGGCAGATGCACCGGTAAGTACGTGTGCA
 CCAGCCCCAAGTTGTTATGTGACACTGGTGCTCATGAAATCCTGTGTGGCATAGGGCTGCTGCGGTTTCAGCACTCCCTCTT
 TAACACATCTTATTTCTAAATGTTCTCCTGCACATGATTTTAAAAAATGATTATTAATGTAGAGTATAAAGTTGAGATTTTTC
 15 TGTATTAGAAACATTGCAGACTTTTTCATTATTTGTTTCTCATTATTTGAGTGCTTGGCCATTAAAAAATCTACATGGATAT
 AAAAATCTATGTTTATTTATATATTTTCTTTTATTTGTTCTTCTAAATAATATTGTTCTTCTGTTAAGTTGTCTCTGTTTGGTTGT
 GTAGCATCTCATATGGTATCAACCACGTTGTCTATAGTAGATGCCAGTATTGTACCAATGCTTTGGGTTACTACCACCATTTT
 TAAAGTTTATAATTTGTGAAGGGTTGCTCTTATGTCTTAAGGAAAAATCAGAGCTAATAACAGCTGCTAAGATTATTTAGTAGTA
 CTAAGTGGTAAGTACTGCTCAGGGGCTTCGATGAATGATTAGTTAGTTAATTTCTACAATTATCCTGTAAGGTTGGTATTTATTTT
 20 ATTAATTTTATTTTATTTTGTAGACGGAGTTTCGCTCTGTGTCAGACTGGAGTGCAATGGCAGGATTTTCGGCTCACTGCAACCT
 CTGCTCTCCGCGTTCAAGCGATTCTCCTGCTCAGTCTCCGAGAAAGCTGGGATTACAGGCACCCGCCACAGCCCGAGCTAATTT
 TGAATTTTGTAGAGACGGGGTTTCTCATGTGTGTCAGGCTGGTCTGAACTCCTGACCTCAGGTGATCTACCCGCTCGGCT
 CCCAAAGTGTAGGATTACAGCGGTGAGCCACCGCCCGGAGGAGTGGGTTATTATTCATTCTATTATTCATTTGAGGAAAT
 25 GAGGCACAAAGAGCTTAGTCAATTGCTCAAGATTGTATACCTAATAAGGGATGGTGTGGGTTGGAATCAGAAGGTCTGTGTTCT
 AAATTCCTACTTTTACCATTTTTGGCAATAATTTATAGCTCTAAAAATATTGATAGTTCTGTACCAATATATGAAATAAAGTGT
 TCTCTCCCAAGAACTTAGTAATCTTCTATTTTGAAGGCATGTATTTATTAATTTTATTTAGCAGATGTTTGTGAGTGGCTTAACA
 CATGCTAGAACTCTGGGATCCCAAGGAGCTTTGTGTTGTGTGATGTTTGCACAAATGGGATTAAGGTTTCAGACATAGTTGATT
 30 TCTCCTTTTGTAGTCTAGTGGGAGAAATTTTGGCAGATGACTGCATTTTTTATGCTAATGTGTATCATCTCATAGTAATCTACT
 CTCACAGTGTGTAGAAAATGTGGCTCTCATATTATCCAACTCATTAAATTTCAAATTATTTCTCTCCCTTAGAATATTCTTA
 CAAGCTCCGTTTAAATGGCACCAGCATCAGAAGTGAAGACAATGTTCTCAAGCATTTACAGTACCTAAAAACAGGTCCTCGCG
 AGCCCTTGCAGGTAATTTACTATTCCAACATTTGGTATTTTAAATTTTCACTGAGAAAATGTGCATCTTTGGTGGTGGTGGTGGT
 35 GGTGGTGTAGTGTGGTGGTCTGTTTTGTTTTCAAGTTTGTAGCATAGGGGAGTAAATGCTTTTATACAACTTTGATGATGTT
 CTAGAAAATCCAATAATTTCTTTTGTACTCATATGAGACATGCTAGAAAATTTTATCAGTGCAGATTCCCAAGCATGATGA
 AATGAAACATTTCTTACTGTGACTGAGACTAAGATGATTTACACGTGTGCTCACTATCTTCTCTGCTCAAAATGTTTTATAAAA
 40 TATATCAATATAGTTTACTTTATGTTTCAAATTTTATTTTATTTTATGCTGTATCCCTAGGCAACCAAGCTCAGAGACTGTTCCAA
 TTTTAAATGAAGTCTGAAATTAGTCAGACAGAAAATAATGCAATGTATTGACTGTGAGAAAGAAAGTCACTGTCAATGTTG
 TGAGGCCGATCTGAAGTTGACCATCTGCTGTGAGGTTTAAATATCAAAAGAGATTCCCTGTGAACCTTAAAGTGGGTGTGTGTTG
 ATGAAATATAACCAATTTCAAATTAATCTGAGCCAAATGTAATGAAGTGAATTTGCTTCCCTAAATTTTAAAGCAGTT
 45 TGTACATTTAAATAGCCCAATACCCAGCCACCTCTCAGAGCCCTCTCCTCATCCCTGTGTCATGAGGAACTCTCATACC
 CTAGAGGAAGTGAAGAGCTGGATTGAGAAGCTGAAGGTCAATTTCTGTGTAAGTAAATGGCAGCATCATAGGACAGCAGCC
 TTTGAGTCTGCCCATTACCTTAAAGGGATTTCCCATTTCTGTGATAGTTTCTCCTTCCAAATTTGTGAGAACTGAAAATCTGCCC
 50 GTAAGTATTGTGATGCTTAGTTTTCAGGGTTTTTGTGATGCTTGTGTTTTTGAACAGGGTCTTACCCCGTGCCAGG
 CTGGAGTGTAGTGGGTGATCTCGGCTCACTGCAACCTCCGCTCCAGATTCAAGTGATTCTTATGCTCTCAGCTCCCAATTAGC
 TGGAAATACAGGTGTGAGCCACCGGCAACCCAGCCGTTTTTTGTATTTTGGATAGAGACAAGGTTTTGCCATGTTGGCCAGGCA
 55 GGTCTCGAATCTCTGTTTTCAAGTGTCTGCCCCACCTCGGCTCTACAGTGTGGGATTACAGGTGTGAGCTTACCCAGCTAGCC
 AGTGCCTAGTATTATTGTAATAAGGATGCAAGCATTGTTGTTAATTAATCAGATTGCTTCTTCTGCTCTCTCTGAC
 AGCAATGTTTTGTGTAATGCTGTGAGTGGTGAATGTGAGACAGGAGTCAATTTATGGGAAATCTGGCAAGTTCTCTGCTG
 60 AGTGAGCTGGAGTTGGCCCGTGTGGAGAAAGTCAAGATACCAACAGAGGCGAGAGCAGTGGCTATGCTGTAATCCAGC
 ACTTTGGGAGGCCAAGGCGGTGGATAACTTGAGGTGAGGTTTGAAGCAGCCTGGCCAAACAGGTGAAACCCCATCTCTACTA
 ATCCAGCTACTCGGAGGCTGAGACAGGAGGATCGCTTGAAACCCAGGAGGAGGCTGCACTGAGCCGAGATCATGACACTGCA
 65 CTTAGCTTGTGTTGTTGTTTCAAGTGTCTGCTTCAAAAAGCAATATCAAAAATTAATTTGGGAGATGAGGAAGATGAATCCCA
 CCCAGACATAAGAGGAACCCAGAAAGGGAGTTACAAAGATTTCAAGGCAAGGGCAGCCATTCAAATTTTCTGAAAGCTGTTT
 TTAGGTCAGAAAGAAAGCTTTTGTCTTTTTTTTTTTTTTAAATATTCCACCTAAGTTACTTGGCTCTTGGTTTCTAGAGAAC
 70 GAATTAAGTACTGCTATTCTGTTTAAATTAAGTTAGATTAGTTTGTATATTTTCTAACTAGTCTGGGCAACTGTAT
 TTGTAGTACAGAAAAGTCTGTTCTAAATTTCAAAAAGCCAAACATCAATATACTTGGGCAATTTACCATCATATGAGTTG
 AAACCCATAGTTCAATTTAGCTTTATCAGTATATTGTATTTTAAATGGAATATTGGTTATCTTTGAACTCAAATTTAA
 75 GTTAGCTCTATTTTAAATCTGATTTCTCTGTCTATCAGTGAGTCAATTTGGCACTTTATGAATTTCAACATCTGTACACTG
 AGATTAAAGTCTATGTTGAGGTAATATTGTTCAATCTCAAACTGAATAATTGAGACTTGAAGTTAATTTAGAGTCAAT
 ACTCCTGTCTAAACCATATAGTTTACTGGTTTACACTGACCAGATATTTTAAATCTGTCTATAAGCCAGGCTCAGTGGCTCA
 TGCCTGTAATCACAATCTTTGGGAAGCCAAAGCTGGAGGATAGCTTGAGACCAGGAATTTGAGACCAGCCTGGGCAACATAGTGA
 80 GACTCAGTCTCTATTTAAAAAATAATTAGCTGGCTGGGCTGGTGGCTCAGCCTGTAATCCAGCACTTTTGGAGGCGAGGTG
 GCGGATCAGGAGTCAAGAGATCGAGACCATCTGGCTAACACGGTGAACCCCGTCTCTACTAAAAATCAAAAAAATAGCCGG
 GCGTAGTGGCGGCGACCTGTAGTCCAGCTACTTGGGAGGCTGAGGAGGAGATGGCATGAACCCAGGAGGCGGAGCTTGCAGT
 85 AGCTGAGATAGCGCACTACACTCGGCTGGGTGAGTGAAGGAGTCTCATCTCAAAAAAATAAAAAAATAAATA
 ATAATAATAATAATTAGCTGGGTGAGTGGTACATACCTGTAATCTAGCTACTTGGGAGGCTAGGCGAGGAGTCCCTTAAGCC
 CAGGAGTTCAAGGTTACAGTGAAGTATGATTATACCCCTGCACTTACGCTGGGAGACAAGCAAGACCTTGTCTCAAAAAAATA
 90 TTTTAAAGGCGCCGTTGGTGGCTCACACCTGTAATCCAGCACTTTGGGAGGCGAGGCGGGTGGATCACAAGGTCAAGGTTT
 GAGACCAACCTGGCCACATGGTGAACCTGTCTTTACTAAAAATACAAAAATAGCCAGGCGGTGGTGGCGCATGTAATCC
 CAGCTACTTGGGAGGCTGCGGAGGAGATGCTTGAACCCAGGAGGTGAAGTTGAGTGAAGCCAGATCGTGCCATTGAACCTCC
 AGCTAGGCAATAGAGTGAAGTCTATCTCAAAACAAACAAAAATTTAATCTGCTATAATAGATACTAATTTATTAAAGAA
 95 TACTTAGTGAATGTTTCTACATAGTGGCAATGGGAGGAAAAAAGAAATATCTAATAGTGAATGTTTATACACCAAGTA
 TCTCCTTCATTTTATGTCATGGAGTTCTAGCTCTGATATCACAGAAATATGTGATTCTAAATGTTTCAGACTATTGTGATAAG
 TATTGGAATAATGCATCAAGTGAATTTAAACATACATCACTATATTTTATATAATCTGATTCAATAATTTTCTATA
 100 GATTTTATGCAATTTGGTAATTTTGTGTTTGAACACAGTACTTATTCATATATTCTATTGATAATTTTGAACCTAAT
 TAGGCATATTTCTCACATGTTTATTTGAACATATTGCACATTTTAAATGATATGTATTTTACTTAAGAGTACTTTATATAA
 TCTATAATTTTGTAAATTTGACTTATAATAATCAAAATTAAGTGGGATTTAGCCAAACCTAGACATTTTGTCAATAGT
 105 TTTTATTAACACGCAAAATAGGAGTTTCAAAATATTTAAATTTGAATACTTCAAAATGTAAATGTTTGAACCTGGTGA
 TGCAGTTGATTGTCTATCCCTCAAACTGTCTAAATACTTAGGTTCAAGAACAGTTTATTGAAGAATAGGAAGTGCAGCAATTC
 TGTGTTTTATCATTTCAGTTTAAATCAACCCCGCTGATTATGGCAACCAATTTAGACAGCAATTTACTATTTTGAGGCC
 CATATACTGGCCATTATGGTTTTGCTTCAAGCTGATATAATGACATGCAATATATAAATATGTTTGTGTTTTAAAT
 110 TAGAAATGCCAGAGCTATGTTGTTGACATTTTATTATAAATTTTGTACACATAGATGTGGAATAATATATCTATGTTT

[illegible]

GACACACTCCTGTAGTCCCAGCTACTCAGGAGGCTGAGGCGGGAGGCTTGCTTGAGGCCAGGAGTTTGAGGGAGCTGTGATCACGC
 CCCTGCACTCCAGCCTGGGCAACAGAAATGAGGCCCTATATCTAAAAAAGAAAAATGGACAAGAAAAATTCATATTGATTGAAGC
 CCAGCTAAATAGAAAAAATAATCTAATAGGCCATTTAAAGACTTTGGAAAAATTCCTAGCTAGATAGAAAAACAGAACATCC
 5 TTTCTTTCTGGTTCTCAGTCTCCATTCACCTTCCCTTCCCTCCATTTGTTTCAAGTATTTTTCTTTCTATGTGTG
 TCTTTATGTAATTTAAATTTACCTACAGATATTATGATATTAAAGATATTTCACTCTGCTTCTGTTTGTCACTTGTCTTTAA
 GATCCAAGTCTTGGCTCCATGTGCATCTAATCCTTGCCATAAGCCCTGCATCGTACTTCATATTACCATATTGAACATTACC
 CTCAGTAGTCACTATTAAATGTCACTGTTGTAGCGACTACAAATGCAAGCTCAGTAACCTGAAAAAGATAACATTAAATTTTGT
 10 TTTAATTTGGTTTCTGTGTCAATTTCACTGTTTGGGAATTTGTATGGACAGATAGACACCAGAGAGATATGCGTATTTCACTGC
 ATGCTTGAGGCTAGAGAAACATGATTTATTGAGAATCTTTCAAATACTGTAACCTGGAATTTTGTGTTAGGAAAAACATTAA
 ATTCGGAATAGAAAGCAATTCAGAATACCTGTCTGTTATCTTTGTCTTGTCATTTTTGAGATACTCAGTTCCTGGAAAAATATTATG
 ATAATCCATCTTGCTATGTAGTATTTCAAGTTATATGTTGAGCCTCTGAGCTTGACAGAGTGAACATTTCTATTATAGACAGTGT
 GTTGACATCAGTGGGAGATGGCACAAGCTTTGTGCTCTAGGAAAGTTTAAAGCTAGAACATTACCTGCAACCCCTATGTGAGG
 15 AAATCTTGTGTGAGCAACTAGGCAAGGAAACCTACCCTGACCATACCTTGTGTTTAGTAGAATTATGTTCTTTGCTTAAGAA
 TCTGGTGAATCTCACACCCCTCTCAGCACTTTCTGGAATCCAAGGCCCTGGTGCCTGAGCACACAACCTCCAGGTTCTTTT
 ATTGTTTCTGATAAGAACTCGAATTAGAGGAGCGCTCTGCTACTCACCAGGGGTGTGGTCCCATGGGTGACATTCTTGCTCCATCA
 TTTCTTACCAGGTAACCTTGAGTATGGCGCTAAATCCTCTCTTCTTCAAATGCTGGTCTGTAAATGGATGCAATGGAATG
 20 TTGACATATGCGCACAGGTTTGTGTGAGAAATTAATAGAGGAGTTATATCAATAACACTTAGAGGCATGCGGTGCCATATAGTGA
 GGGCTTGTGTTTATGTTGCTGTTTAAACCTTTCTTTCTCAGCCCTCCCCACTCCACATCCCTCCCTCCCTGGAATGACAAATG
 AGCTTCTGCTCTTTCTGCTATCTCGCTCCCTGGATGACATCCCTGCGTTTCCACCTCTCTCTCCCTAATCTTAGCTGTTTCT
 ACCCTTTCCCAACAGCATTGCTTGACAGTCTCAGTGTCCATGCTCCCTCTTCCCTGGAACAACCAACCAACGACACGCG
 25 CTTGTTATTATCTCTGTTTCACTGTGTCTTCTGTCTCATAAAGGACACTGTAGGCTCTGAAACAGCTAAGGCCCTTCTTAT
 TCTTTTGTCCCATGGAATAATCCCTCCAGATAGCAATACAGGAATAGTGCTTTTCTAACCCTGCTGTTTCTTTGAGCTTA
 CAGCCACCAATCTTATCTGTTTGTCTGTTTCTGTTCCCTCTCTGCTGCTGCTAGAGAGATCAGAGTCAAGCAGGAGTTACAT
 CTAGCTGGGCACTGTGCTTTATGCTGGTGTTCGTGTGCAATCTCATACCTCTCTCATGTTACAGTTGTTCTTTAGTGTCCATG
 30 GGGGATTTGTTTCAAGCCCGCAAGGACACCAAGTCCAGGGATGCTCAGTCCCTGATATAAATAGCATTGTGTTGCTATATA
 TCTACACATCTTACCATATAATTTTTTTATTTATTTGTATACATTCGTGGGGTACAAGTGAATTTTGTGTTGCTGTAATG
 CATAGTGGTCAAAGTCGAGGCTGTGAGTGTATTTATCGTTGGAATAATGTACATTTGACCGTTCATTCTGTATACCTTTAAGTCA
 TCTCTAGATTCTTATAATAGCTAATACATGTAATGCTATGGAATAGTTGTTATATTGTTAGGGGATAATGACAGGAAAAACA
 CCTATACATGTTTCAATACACAGCAATTTTCTTCTGTAATTTTGTATCTGCCATTGATTGAATCTATGAGTGGCAACCA
 35 GATATGGGACCCACAGATGACAGGGCCCACTGTGTTTATTTTTTCAAATTTGTTTCCCTGTTATGACTCTTCTTTATACACATT
 TTTAACTCTGTTGTCTGTATTTCTTTCTAATCATCTTACGTCTTTTGGAAACCAAGTGGGGCATAAATAGTACATTTTGCA
 TTTGAGGCAACACAGAGCATCGCAGGAGCTGGAGACAGCAAGTTCAAAGCCAGTCCACCACTTACCTACAGAGTGGCCTTGGG
 AAGTTACCTCCATTTCTGCTCCATTCTCGAGCTGTCTAGAGAGAGATGAACCTGCCTCCGAGGTGATGGTGTCTTTAAT
 40 GAAATATGCTATGGAATGTGAAGTGCCTGCTGCGCATGGAGATGCTGCTCTAGATATTAGGTCATCTTGTATCTTCTA
 GTGTATCTTTAAAAATTAACATACTGGCTTCATGCTGTAATCTCAGCACTTTGGGAGGCCAAGACCGGACATCACTGAGTC
 CAGGAGTTCAAGACCAACCTGGGCAACATGGTGAAACCTGTCTCTACAGAAATACAAAAATTAGTGGGGCTTGGTGCCAGTGC
 CTGTAGTCCAGCTGCTTGGGTAGCTGAGGTAGGAGGATCACTTGAGCCAGGAGGCTGAGGCTACAGTGAGCTGTGATTGCACCA
 ATACCGATCAGCCTGGTATGACAGAGCATGACTCTGTCTCAAAAAAAGGAAAAAATTAACATACTGATAAATATTCTAA
 45 AGTAATGATGAAAAACATATATATGACACTTAGCAGGTATGATCAATTCAGTGCCTGCTGATGAGCTGCTTTGCACTGGCTAG
 GCACTCAGCAGTTTCTTAGTGTAGTAGAGGCCATAGCTCACTTTAGGTATCTGGAGAAATATGCTCATTCTGTCTCCAGCTTTG
 TAAATTTGCCTAATAGAGCGGAAGGCATTAATATGAAGATGGGATTATATCTTATGAAGCTGCTTGGAAATGGGTTTCCCTCTTA
 ACAAATTAATTTCTGATCATCCATATCCCTTAAGAACACCGGATTTCTGGGGGCCAGGAGGTAAGATTCTATGCAAAAGCTTC
 CTGGTGTCAACCACTTGCATCTGTTGGTCACTGCTGGCCCTGCTGGGTCTATAGAATGAGCTTCTTTGTCTGACGCTCTCTGTC
 CATCCCTTTCTCCATCAGCCTTGTAGCAGTACCTGGGAACCTGCATCTGTGGAAAGATGGAGGAGCAGATGACATCTTCCAGTCA
 50 AGCTCGTAATACGTGAATGCAATCTCAGCCCGGAGCTGGTCACTGTGAGACATTTCCAGAAAAGCATTATGGTTTTCAGAACAT
 TCAAGTTGACTTGGGATATATCATCTCTCAACATGAACTTTTCATGAATGGGAGAGAACCTATTTTTGTGTGGGTACAACAGTT
 GAGAGCAGCACAAGTGCATTAGTTGAATGAAGTCTCTTGGATTCCACCACTAAAAGGATTTTAAAAATAAATAACAGTCT
 TACCTAAATATTAGGTAAATGAATGTAGCCAGTGTGTTAATCTTAATGACAGATTTTAAAAAAGCAATTAATGTTTATCT
 55 TGTATTTAAAGGATCCAACAGATCAGTATTTTCTCTGTGATGGGTTTGTGAAATTTGACACATTAAAGGTACTCCAGTATTT
 CACTTTTCTGATCACTAAACATATGCATATATTTTAAAAATCAGTAAAGCATTACTCTAAGTGTAGACTTAATACCATGTGAC
 ATTTAATCCAGATTGTAATGCTCATTATGTTAATGACATTGAAGGTACATTTATTGTACCAACCATTTTATGAGTTTCTGT
 TAGCTGCTTTAAAAAATATTACTGTAAGAAATGTTTAAAAAATATATTTTATTCAAGTAAATTTTGTGTAATGCTGCA
 60 ATGAAAAAGCTTTTGTGCTATGGTCTTAGCTGTAGACATGCTGCTAGTATCAGAGGGGAGTAGAGCTTGGACAGAAAGAAA
 AGAACTTGGTGTAGGTAATGACTATGCATAGTATTTAGACTTTTAAATTTTATATATATACATTTTTTCTTCTGCA
 ATACATTTGAAACTTGTGTTGGAGACTCTGCATTTTATTGTTGTTTGTGTTTATACAGCATGCGTTGCA
 TTTCTTTTGGGAGATGTGTGTTGTGATGTTCTATGTTTGTGTTTGTGTTGAGTGTAGCCTGACTGTTTATAATTGGGAGTTCTGCAT
 65 TTGATCCGATCCCTGTGTTTCTAAGTGTATGGTCTCAGAATGTTGATGAGTCTGCTGTTTGTGAACTGGGAGACAGAACT
 GTGTTGATAGCCAGTCACTGCTTAAGAACATTTGATGCAAGATGGCCAGCACTGAACTTTGAGATATGACGGTGTACTTACTG
 CCTGTAGCAAAATAAGATGTGCCCTTATTTACCTACTTTGTTTCTCTTATTGTCATATGGACAACAGTTACACTTTA
 AAGAAATGGAGCAGACTCAAGCACTTTCTCTAATAATGACACCATATGCATTTCTGTGTAAGAGCCAGGAATCATTACAA
 70 TGGAGAAGAAAGAACCAAGCAACTGAGTTAAATAGTTCAACAACATCAGATGGACAAATGGGAGGAATCTTCCAGAATGCATCAG
 TCAGGCTAGCGGCATTGAGTGCAGTGTGTAAGGGGAATCGTTCACAATGTACTGATACCAGATGTGGGAGGGGCTA
 GGAGAGCAACAGGGTGCAGGCCCTGAAGGCACTGGAAGGCCGCTGGAGGGGACAGTCAGGAAAGCAGGAGCCCTGAGAGGAGC
 ACTAGCTTTGATGAGACCACTGCCATCGAAGGAGCCTCAGGAGGGAGCCAAGGGTAAACCTAATCTTGTTCCTCCATTTT
 75 TCTATCTTGCCTAGGGTCTCTCTGCGAGAACCAACAGAGCTGGAGGACAAGGGAGCTCCCATATGGGAGCCGCTGTGA
 GCCTTCAAGGGTATGCGGAGTCTGTTGTTCAAAATAGCCCATTTACAGATGAATCTCTACTGGCTCCATCTTCACTTAGTGT
 CTCTTCACTATGCTGTAATATCCCTTTAAACATAAATCCTTTAAATTTCTTTACTCACTCTGTTCCAATCTGAATCTCATGG
 GCATGATACACTTGGTGTCTAGAGCCAGGATTTGTACGCTAATTAAGTTTGTGATCAATTTGAGTCAATTTGGTGGACTTTTACTGTC
 CTGCTGATAGATGACGTGACAGCTCTCCAGTGTGGGAAGCTTTATATTATGCTGCTCTCCAGATTTTCCAGCGCTGA
 CTCTGCCACTTACTAGCAGTTTGAATCTAGACAAGTCACTCAGATCTCTGAGCCTTTTCTTATCTGGGCAATGAGTTCTTTTCC
 CACAGTGAACCTTTTAAAGTAAATGCACTATACAAATGTTGTTTATTATGTACACTTTCCAGTCCAGTATGCTGCTGTGTA
 GTGTGTTGAATGCCATCTGCTGATAATGTGCACTGCCAATTACACAGTTATATTGAGAGGTCACTTAATTAATGACAAGAG
 TGAATCAACATCTTACAGAAGTGAATAGATTTATTTTCAACACGCTTGAACCCAACTAGAGACTCAAAACCTTAAT
 TCAAGAAAGAGGTGAATTTAGCTGTTATGCTGTTAACTACACAGCACACCCAGTTTCAAGCATCTTCAAAACCTTGTATG
 TTTCTGATCAATTTTGAATCATCTGCTCTCTACAGCAGGAATTCAGGTAGTACAAGTGAAGACAGTATTATATACTACTTAAAT

5 GAAAGGCTGCCCTTGTGAGTTACTGTGTGTGAAGTTGCTTCTGCGTATGTCCATCCAGAGAACGAGAGACACTGAGAAGACTGA
TGTTGCCCGACCTCTAGATGGGACTGAAAAATCAAGATAAGAGAGATGCCAGGGATAAACTTCTTCTTTCTTTAGAAATTATA
CAATATTAGAACTGAAAGGGACATTAGATATCATCAGGGCTTCCATAAGGGGCTCACTGTCTTGCTTTATGTAAAGAAATCAGT
10 TTTGAAGCCAGACCAATCTTTTTTTTCTTTTAAATATAGGTGGTGTCTTGCCATCTTGCCAGACTGGTCTCAAAATCTCTGGGT
TCAACCACTCTCCACCTCAGCCTCCCAAAGTGTGGGATTACAGGTGTGAGCCACCGCAGCTGGCCACCAATCTTGATTGAAAT
TCAGACCCTACCTTTACAGCTGTGTGACTTTGTATGTTTACTTAATCTCTCAAAGCTTTATTTTACTTATATTATATAC
TGGAGATAAAAAATGCAATTTCAAGTCAAGGTTGTTATGTGAAGATTCTGCAAGTAAATACATTCTTGATCTCTGTAATGTTGC
CGTGCTGTGATTAGATAAGTACCAGTATGACTTATGATCAATTAGAGAAAAATGTCTGTTACCCAGCGATGGGAAAGTGAATA
15 CCTCCGAGACCAATGTCCTCAATTTGTGTGTTAAACTATTCTATGTTAAAACTTACTTTAAACTCAATTATATCTTCTCAAAAT
ATTACTAATCATTTCAACATATTTTAGTTAATATGTTTCTCCTTGACAAATATATATGTGGGAAGTAGAGGGCATATTTTCTCT
AAGCTTGCTGCTTTCTAATCCAAAAAAATGTGATGTGAGGCTTATTACACTCCACTTAAATACTTACAACCTTTGGGGCTTATT
TTTCTCCTTTGAACCACTTACTATTATAAAAAATCAATCTTCTCTTAGTACCAAGTCTCTCATCTTGAGGAAAGGAAGTCAAGTAAA
ATACAAATCTCTTTGTAAGTAAAGTTTAGCGACTTGGGAGGCTGAGGTGGGAGGATCCCTTGAGCCAGGAGTTTGAGACCAGC
20 CTGGACAACACAGAGAGACCCCTCTCTGAAAAATAAATAAATTTCAAAGTAAAGTTTACTTATATACAATTATACCTAGTAACCTT
TGCTCCCTATAGCAAAAGGAAGCTAACTATAAATCTTATGGAACCTTGTAGTGTCTGGTAAATAACAGTTAATAATTTTTTAA
ATTAATATTGCAAGTAAATACTTGGCCAGGTGCGGTGCTCATGCTGTAATCTCAGCACTTTGGGAGGCTGAGGCAAGTGAATCTTGA
CACCTGAGGTGCGGAGTTCGAGACCAGCTGGCTGGCCAACTGGCAAAACCCCTCTCCATTAAAGTACAAAAATTAGTGGGGT
GTGATGGTGGCTGCTGTAATCCAGCTACTTGGGAGGATGAGGAACAAGAACTCACTGAACTGTGAGGCGGAGGTGCACTGAG
CTAAGATTGCACCACTGCACTCCAGCATGGGCGACAGAGGAATGCTCCATCTCAAAAAAGAAAGAAAGAAATCTTGAATCTTGA
25 CTAAATATGGAATGAAAGAGGTGGTTGATATTTGCTTTTACACTATATTTCTTTAATCAACTAGTACATGTGAGGCTCTATTT
TGTGCCAGGTGCTGTGTGAGAGTTGGGGTTAGAGCTCAGAACACATAGATCAAAAGTCCCTGCCCTCTGTGAGCTTATGTTTGA
TGGGAGATACAGATGAGTAAAGTTTACTACAATATAATCAGAAATAGGGAATACCGAGACACAGTACAGCACTCAAGACGTGG
AGGAAGAAGACAGGTTTCTACAGAACTGACACTAGGCGAGTCTGACAGATAAAGTCAAGGCAAAAGTTGGAAGGACAGTAGAGT
AAGATGTGACATCTTAACTTGTGAATAAAAAACCCCAATATAACAAGTTATCTTTAAATCATGATGATATATTGTTTGA
30 CATTGAGGAGTCTACTACCTGAGTATATCTAGTTAGTAAATTTTTCCCAGTCTCCAAACACAGTTTACACCCCTTTCTCT
CAAACTCTCCATCCCGTTTCTACCCAGTCCCGCAGATACTTTGACTATACAGAAATGAGAAAAAGAGAGCGCTCAAGAGCCAC
ACCTGCATGCTCTACTGCTCTTGTAGCATGGGTGAGCATGCCAGCTGCAGTCACTGAGCTGGCCATCCATCTGGCCTCTGCA
AGCCATCTCTGTATCTCAGGGGTTTCTCTGTGAATCTCTCTCTCCCGACATCATATTGTTCTTCTCTCTCCCAAT
35 ATTCCTCACTTAACTGCTCACAATCTCCAGAGGAAGAAAGAAATGTTCCCTCATCAGTATAGTTTAAATTTTTTTCTTTCTT
TTTTCTTTTTTTTGGGGAGTGGGACAGAGTCATGCTCTGTATACAGGCTAATCAGTATTGGCACAATCAGGGTTCACTGCA
GCCTCAGCTCTCTGGCTCATGTGATCTCTACCTCAGCTTCCCAAGTAGCTGGGACTACAGGCAGTGGCCCCAAGCCCCACTA
ATTTTCGTACTTTCTGTAGAGACAAGGTTTCAACATGTTGCCAGGCTGGTCTCAAATCTTGAGCTCAAGTGAGCAATATCCCT
TATATACCCCATCATACACCCCATTTATCTGCTCTCAGCAAACTGCTTAAGGGAATCTGTATGGCAGGTCCCACTTCCCA
40 GGTGCTCTCCCTCTGCCCCACTCCATGAATTTTCTGCCCCACTCTCCATGCTGCTCTTCAATGTACAGGAGTACCTCC
ACTTCGCCAAATGCTGTAGTCACTTCTGGGCTCATTTTACTTTACTTATGTCAGCAGTCAACAGAGTTTGCACCCCTCTTCT
TCTAACCAATTTTTCTCTCTGCTTCTCAGGCTGACTCTCTGTTTCTCTGCTTCTCACTGGTTCCTCTGTTTGTGCTCTCTCT
CACTTTGGGCTCAAGTGGCCCTTCTCTCTCTCTCTCCATCTTCTCTAAAGGATTTCACTGAGTCTGTGGCTTTAAATACC
45 ATCTCTCACCCCTGAGCCCACTCTGAAATTTAGACTCTCTGACGCTATTCCATGTTAAACATCTTCCCATATAAGCATTTGA
TTAAGTATGAACAAAACAGAACTCATAATCAATTAATGCTTTTTCTCATTAGCAGTAATGGCCCTGTATCTTAATTTCTCA
TTTCTCAAGCCAAAATTTGTATCTTGTGTTCTCTCTTTTACCTTATTACCTCTTACACTCAAATGCTCAGAAAGACCTGAAT
ATTCTATCTCAAAATGTATCTTAAATGTCTGCTTTTTCTATTACCTGTAATAATCTGTTAGTAAATGACCAATATTTATGAA
50 GTGCTCTCAATATGCTAGGGAAGAAAGAGAGGAGAGAAAGAAAGAAAGGAGTGTCTGAGAGGTGAGTTTGAAGAACT
GAAAGAGAAACCTGGAGGAAAAAAGATACAGGCGGAGAGAAAGCGGTGTAATAGAGCTTGAACCTTGTCCGTAGAGATA
TGGGAGTATGGAATGGTTTCTGAGTGATATAAAATCTTATTTATAGCTGATTATATAAAATTTTGTTCAAATCCCTTT
45 TTTCAAGACAGTATAAAATTAACCTTAGTTAGCAGGGCCAAATGCTGGCAGGCTGAACTTATACCTTAAATGGATTGT
ACATAGTGCACTTCTACTGCTTCTTAATTTCAAAGAAATGTGCTTAAATCCAGAAAAATCTTATGAAACATATCTTTGATC
CGAAGTTTCAAGGGCTGTTTTACGCTTTTATAGTCCATAAAGTAATAGTTTCAAGGAAGCTGATTACTTAAATCTTTTCTTT
55 TTTAAGACAGATAATTATCAACAAATAATTTCTCTAAAGTTTCTCATCATTTTCAAAGCCAAATCTTACTGAAATTTTCG
TATGGAATAATCTGATTATATTTGATATTTGGTCAATTAAGAAATCTGCCAATATTTGTTCTTGAAGGTGTTCTTAGCTTAAT
TTATATTTCTTTTACTCTTTAATCTAGAATGCAATTTGTAGAGTCAATGATCCTCAGAAACACATTTGAAATTTTAAATGGA
50 GATTCTTGAGCTCACCCTCGGATTTCTGATTTATGAGTCAAGGTGAGACCTGGGAAGGTTTAAACAGCTTGCAGCTGATCTTGA
AGGTGCTGAGAGGACCACACCAAAACACCTGCTTACTCCCCAACCTGCTGTTTTCTGTCTAAACACTCCCCAATAGCTTTC
AATTCCTTTGGGGCCCAATTTTAAATTAATAGCCATTTGCTATAGAGTATTAGAAAAATATTAAGACCTTAACCTATAAGTA
GATTTCTTTAAATCCAGGGAATTATTATGTTCCAGATGTTGGTACTAATAATGGCTAACCTCGGCCGCTGATCCATCTTTGTTG
55 ATTTTATAATATATGGGAAGCATAATTTGTATATATCTAAACCTCTTTAGAAATATGGTTCAATTGCATATGATCTGTCTATA
GGGAATTTATATCTCAGCAAGTTAAGCGCATAAACAAAACAGACCAACACACACACACACACACACACACACACACAC
ATTTTCATTAGAAATCTTGGTTCTAAACCACTCTCTAATCAACATGCCAAAAACCTTGTTCAAATCACTTTACTCCTCTGTG
CTTTGGGATTTCTATTAAATGGGGTAAGTATTAAATCCTGTATATAGTTTAAAGCCAGGAGAACCTCAGATCAAGACAAAA
60 TTGAAGAAAGCTTTAGTAGGCCAGAGACATTGGAGTACCAAGGATATAATGTGAGGTTTCTGCTAGAAAAATCCTCTGAAA
TGAACCTATAAGTTAAACAAATCACCTCTGCTGTGTTTGGGGCAGATGTTAGGCAGAGTCAAGATTGTTTCCATTCCGTCACT
TTTCTAAAGAAATACAAATCCATCCACTATTCTTAAATGGTCTTAAATAGCTAAATGGAACAGCACTCCCTTCCCTTCTTGC
CCAGTTTCCGAGTCAAGGCGCGAGTGTTCAGTGTATGACCTGAAGCTCTGGAAGTGGTGAATGGTTAGGGTACTCGCCAGTT
70 TGGCCTTACTTTGAACATCCCAATTTATTTCTTCCCAATTTCAAATATTTCCGAAATGAAAGACATTAGGAGCAGTATTCTGGT
TAAATACGGTGAATTGAAATACGAATGAATGCCACTCATGATAATTTCACTAAATGACAATGAGTCAAGCAATTAAGGGGCA
65 AATATACAGTTTAAAGAGAACACAGGTAAGAGATTATTTGTCAAGAGCCTGTAACCTATTATTTATCAACAAATTTTACTGA
GCACCTCTCTGCAAGCAACACAGAAATCAAACAAATTAATATGATTATACATATACAGCATATATGTTTACATATAACAAATATA
TAACATATAAAGTTACTGGCAGAGTAATTTTCTGGATAGTCACAGATGTAATTAAGAAACAGGCTTGTCTTCAAATTTGCTTT
TTTAATAACCATATTTCTTAAACATATTTCTTTTCTCTTTTACCATTCTGACATCAGATTGTGCTTTTAAACATGGTCTGATTTT
TCTTTGTTGTAACCTTATTAACCCATAGAGTCTTATAATGTATGATACCATAAAAATAAAGGAAAGCTTGGAAATTAACAGCA
70 GAAATTTCAAGAAAGGACCCCTAGGTTTCTTTTTTTTTTTTTTTTTTTTTCTTCTGAGACAAAGTCTCACTGTCTACCCAGGTGGAGT
GTGAGTGGTGAGATCTCAGCTAACTTTCTCATGTAATGAACACAGGAGTGTCTGCTCCCAAAACCTTTGTCCACTGTCTCCA
GACACTCAGAGCCACATGCTTAACGTGGCTCATGGGTTAATGATGTCTGAACCTTTTCAAGGTGGAACCTCCTTTTCTTTA
GTGCTAACCCCAATGCCAACATGACATAAGTGCTCAGTAAATATTAGACAATCCAGTATGAATGTGGTTGAGCATCTGTGAGT
GGTCTACCTCACCCCTACATGTGTTACTAGTGTCAACCACTCATCTCTGTGGGTCTGCTGTCTGCTCAGCTATAAATTTATGGG
75 ATCAGCTCAGCCATAGATTCCCTCCAATCTAATTTCTCTGAGTAAATGAAGTCAATGAAATATGGGAACTCAGGCAGGAGAAAT

HUMAN SEQUENCE mRNA
 GGGCGGACGGCCCTGCGCAGCGCCGGGAGGGGACGCGAGGCAGCGCGGCGGAGCGGACCCCGGTGCTCCCCGGGCTCT
 CGCGGAGCCCGCCCGCCCGCGCCGATGCGCCGAAGACCCCGGCACAGCATATATAGCAGTGACGAGGATGATGAGGACTTTGA
 30 GATGTGTGACCATGACTATGATGGGCTGCTTCCCAAGTCTGGAAGAGCGTCACTTGGGGAAAAACAAGGTGACCCCGGGAAGAGGATG
 AAAAACTGAAGAAGCTGGTGGAAACAGAAATGGAACAGCATGACTGGAAGATTTATGCAATTATCTCCGAATCGAACAGAGCTGCGAG
 TCGGCAGCCAGTGGCAGGAAGTCTAAACCTGAGTCTCAAGGGTCTTGCCACAATAAGAGAAGACAGTACAGAGATGTATAGACT
 TGTACAGAAATACGGTCCGAACAGTTTGTCTGTTATTTGCCAAGCACTTAAAGGGGAGAAATTGAAAAACAATGTAGGGAAGAGGTGGC
 ATAAACCATTGAATCCGAAGATTTAAGAAAACTCTTGACAGAGAAGGAGACAGCAATTATTTACAGGCACACAGAGAGCTGGG
 35 AACAGATGGGCAACCTCGAAGACTGCTGCTGGACGAACGTGATAATGCTATCAAGAACCCTGGAATTTCTACAATGCGTCGGAA
 GGTGGAACAGGAAGGTTATCTGCAGGAGTCTTCAAAGCCAGCCAGCAGCAGTGGCCACAAGCCTTCCAGAAGAACAGTCACTTTGA
 TGGGTTTGTCTCAGGCTCCGCTCAGCTCAAGTCCCTGCCACTGCGCAGCCACTGTTAAACAACGACTATTTCTATTACCAAT
 TCTGAAGCAACAAATGTCTCAGTCACTGTTCCATACCTGTAGCGTTACATGTAAATTAGTCAATGTCCTCCAGCAGCTGCGCG
 AGCCATTACAGAGACATATAATGTATGAAGACCTTGAGAAGGAAAAAGCGAATAAAGGAAATTAGAATTGCTCCTAATGTCAACCGAGA
 40 ATGAGCTAAAGGACAGCAGGTTGCTACCAACAGCAAGCCACACATGCGAGCTACCTCCGGCTGGCCACAGCACCACCTTCCGGACCAC
 ACCAGACCTCATGGAGACAGTGACCTGTCTTCTGTGGGAGAACACCACTCCATCCATCTCTGCCAGCGGATCTCGGCTCCCT
 ACCTGAAGAAGCGCCTCGCCAGCAGGTTGATGATCGTCCACAGGGGCACCACTTCTGATAATGTTAAGAACCTCTTAGAATTGG
 CAGAAACCACTCCAATTTATGATTCTTCTTAAACACTTCAGTAAACCATGAAACTCAGACTGTGAAATGCTCTTTAACTCC
 ACCCCCTCATTGTCAGAAATGACTGTGTACAAACCACTTTTCATAGAGACAGACTGTGAAAATCCAAAGGAAATACTGTTTT
 45 TAGAACCCAGCTATCAAAGGTCAATCTTAGAAGCTCTCCAAGAACTCTACACCACTCAAACATGCACTTGCACTGCAAGTCAAGAAA
 TTAATACGGTCCCTCGAAGATGCTACCTCAGACACCTCTCATCTAGTAGAAGATCTGCAGAGATGTGATCAAAACAGGAATCTGAT
 GAATCTGGAATTTGTGCTGAGTTTCAAGAAATGGAACCCCTTACAGAAAGAAATCAAACAGAGGTGGAATCTCAACTGATAA
 ATCAGGAAACTCTTCTGCTCACCACTTGGGAAGGGGACAGTCTGAATACCAACTGTTTCAGCAGACACTCGCTCTGGCAGAGAT
 CACCGAATATTCTTCAAGCTCCGTTTTAATGGCCACCGCATCAGAAGTAGAACATACTGTTCTCAAGAGCTTTACAGTACCTAAA
 50 AACAGGTCCTGTGGCAGGCCCTTGCAGCCTGTAGCAGTACTGGGAACCTGCATCTCTGTGAAAGATGGAGGAGCAGATGACATC
 TTCAGTCAAGCTCGTAAATACGTGAATGCATTCTCAGCCCGGACGCTGGTCACTGTGAGACATTTCCAGAAGAACATTATGGTTTT
 CAGAACAGTTCAAGTTGACTTGGGATATATCATCTCTCAACATGAAACTTTTCAATGAATGGGAGAAGCACTATTTTGTGTGGT
 ACAACAGTGGAGGACGACGAACGATGTCATTTAGTTGAATGAAGTCTTTGGATTTCAACCACTAAAGAGGATTTTAAAAATAAA
 TAACAGTCTTACCTAAATATTAGTGAATGAATTTAGCCAGTTGTTAATATCTTAATGCAGATTTTTTAAAAAAAACATAAAA
 55 TGATTTATCTGGTATTTTAAAGGATCCCAACAGATCAGTATTTTTCTGTGATGGGTTTTTGAATTTTGACACATTTAAAGGTAC
 TCCAGTATTTCACTTTCTCGATCACTAAACATATGCATATTTTTAAAAATCAGTAAGACACTTACTTAAGTGTAGACTTAAT
 ACCATGTGACATTTAATCCAGATTGTAATGCTCATTTATGGTTAATGCATTGAAGGTACATTTATTGTACCAACCACTTTATG
 AGTTTCTGTAGCTTGCTTTTTAAAAATTTATCTGTAAGAAATAGTTTTTAAAAAATATATATTTTATTCCGTAATTTAATTTT
 60 TAAATGCCAAATGAAAAACGTTTTTGTGCTATGGTCTTAGCCTGAGACATGCTGCTAGTATCAGAGGAGCAGTAGACTTGGGA
 CAGAAAGAAAAGAACTTGGTGTAGGTAATGACATGCACTAGTATTTCAGACATTTTTAATTTATATATATATACATTTTTTT
 TCCTTTCTGCAATACCTTTGAAACTTGTGTGGGAGACTGCAATTTTTTATGTGGTTTTTTTGTATTGTGGTTTTATACAAGCA
 TGGGTGCACTCTTTTTGGGAGATGTGTTGTTCATGTTCTATGTTTTGTTTTGTGTGAGCTGACTGTTTTAATTTGGG
 AGTTCTCGATTGTATCCGCATCCCTGTGGTTTCTAAGTATGTGTTCTCAGAACTGTTGCATGGATCCTGTGTTTGAACCTGGGGA
 GACAGAAACTGCTGGTTGATAGCCAGCTACTGCTCTTAAGAACATTTGATGCAAGATGGCCAGCACTGAACTTTTGAGATATGACGGT
 65 GTACTTACTGCTTGTAGCAAAATTAAGATGTGCCCCATTTTT

HUMAN SEQUENCE - CODING

ATGCCGCAAGCTCCCGGACAGCATATATAGCAGTGACGAGGATGATGAGGACTTTGAGATGTGTGACCATGACTATGATGGGCT
GTCTCCCAAGCTCTGGAAGCGTCACTTGGGGAAAACAAGGTGGACCCGGGAAGAGATGAAAACTGAAGAAGCTGGTGGAAACAGA
70 ATGGAACAGATGACTGGAAGTTATTGCCAATTATCTCCGAATCGAACAGATGTGCAGTGGCAGCACCGATGGCAGAAAGTACTA
AACCTCGAGTCCATCAAGGGTCCCTGGGCAAGAAGAAGATCAGAGAGTGATAGAGCTTTGTACAGAAATACGGTCCGAAGCTTTG
GTCTGTTATCTCCAGACACTTAAAGGGGAGAAATTGGAACAATGTAGGAGAGAGTGGCATAACCACTTGAACTCGGATGAAGTTAAGA
AAACCTCCTGGACAGAAGAGGAAGACAGAAATTATTACAGGCACACAGAGACTGGGGAACAGATGGGCAGAAATCGCAAGCTTA
CTCGCTGGACGAACATGATAATGCTATCAGAACAACCTGGAATTCTACAATGCGCTCGGAAGGTGCAAGCAGGAAGTTATCTCGCAGA
75 GTCTTCAAAGGCGGACGAGCAGCTGAGTGGCCACACTTCCAGAGAAACAGTCATTGTATGGGTTTTGCTCAGGCTCCGCCTACAG

CTCAACTCCCTGCCACTGGCCAGCCCACTGTTAACAACGACTATTCTATTACCACATTTCTGAAGCACAAAATGTCTCCAGTCAT
GTTCCATACCCTGTAGCGTTACATGTAAATATAGTCAATGTCCCTCAGCCAGCTGCCGACGCCATTGAGAGACTATAATGATGA
AGACCCGTGAGAAGGAAAAGCGAATAAAGGAATTAGAATTGCTCCTAATGTCAACCGAGAATGAGCTAAAAGGACAGCAGGTGCTAC
CAACACAGAACCACACATGCAGCTACCCGGGTGGCAGCAGCACCACCATTTGCCGACCACACCAGACCTCATGGAGACAGTGACCT
5 GTTTCCTGTTTGGGAGAACACCACTCCACTCCATCTCTGCCAGCGGATCCTGGCTCCCTACCTGAAGAAAGCGCCTCGCCAGCAAG
GTGCATGATCGTCCACCAGGGCACCATTCTGGATAATGTTAAGAACCTCTTAGAATTTGCAGAAACACTCCAATTTATAGATTCTT
TCTTAAACACTTCCAGTAACCATGAAAACCTCAGACTTGGAATGCCTTCTTTAACTTCCACCCCTCATTTGGTCACAAATTGACT
10 GTTACAACACCATTTATAGAGACCAGACTGTGAAAACCTCAAAGGAAAATACTGTTTTAGAACCCAGCTATCAAAGGTCAAT
CTTAGAAAGCTCTCCAAGAACTCTACACCATTCAAACATGCACCTTGACGCTCAAGAAATTAAATACGGTCCCCTGAAGATGCTAC
CTCAGACACCTCTCATCTAGTAGAAGATCTGCAGGATGTGATCAAACAGGAATCTGATGAATCTGGATTTGTTGCTGAGTTTCAA
GAAAATGGACCACCTTACTGAAGAAAATCAAACAAGAGGTGGAATCTCCAAGTATAAATCAGGAACTTCTTCTGCTCACACCA
CTGGGAAGGGGACAGTCTGAATACCCAACTGTTACGCGAGACCTCGCCTGTGCGAGATGCACCGAATATTCTTACAAGCTCCGTTT
15 TAATGGCACCAGCATCAGAAGATGAAGACAATGTTCTCAAAGCATTACAGTACCTAAAAACAGGTCCCTGGCGAGCCCTTGCAG
CCTTGTAGCAGTACCTGGGAACCTGCATCCTGTGGAAGATGGAGGAGCAGATGACATCTTCCAGTCAAGCTCGTAAATACGTGAA
TGCAATTCTCAGCCCGGACGCTGGTCATGTGA

MOUSE NOMENCLATURE
ICSGNM Sox4
Celera mCG11673

HUMAN NOMENCLATURE	
HGNC	SOX4
Celera	hCG36747

[illegible]

440

441

MOUSE SEQUENCE mRNA

45 AGAGCAGCAGAGTGGAGGGGAAGAGGGCGGCTCCTCCCTCCGGTTTCAGATCTTGCACGCTGTTCTTAGAGAGTCTGCAGTGGGGG
AACTCTGCCGGTAACAGCTCCCTCTCTGACGAGGAGGGAGAAACATACATTATTATTCATGCCGCTGTGTGCATGCAAGCTTC
TTGGCTTCTTACCTTGCAACAAAATAATTGCACCAACTCCTCAGCGCGGATTCCGCCACAGAGAGTCCCGGAGCCAGAGTGCCTT
TGGCTTTGCATCGAGGAAGAGGACTTAGGCCTAGAGACGATGTCGCTCTCTGAGCTACCCGAGCTCTCGTGAAGTCGCAATCG
ACTGCTTCAGGGAAGGGGTGGGGAAAGACTTGCCCGGAGGCGCGAGAAACTTGCCTTTGGAAGATCTCCGGTACCAACGT
50 TTGGAGAAACTCCTCGCCGCGGCGGACTCCAGCCTCGGTGCCCGCAGGAGCACTTCAGCGGTGAGGGAGGACGGAGGGCTCGGGG
ACTCTAGGTTGGCGCGCGGAGGCGCGCCGCTGGCCCGCGCGCCGCTCAGGGGACCTTGCTCTCGCCCGCGGGAGCCCGCAGGCC
CGGCGACCGCGCGGAGCTGTGAGCGCGCTGGGCGCGCGCAAGCGGGGCTATGTTACACAGACAACACCGCGAGAACAC
TGAGGCTCTGCTGGCGCGGGAGGATCGGACTCGGGCTGGGAGCTGGGACTCGCGTCTCCCGACGCTGGCTCCACCG
55 CGTCGACGGGCGGCAAGCGGACGACCCAGCTGGTGCAAGACGCCAGTCGGTGCACACGCTCAAGCGCCATGAACGCTTATGTGTG
TGGTTCGACGCTCAGCGCGCGCAAGATCATGGAGAGTCGCCCGCATGCACAAACGCGAGATCTCCAAGCGCTTAGCAACGCTG
GAAGCTGCTCAAGGACAGCGACAAGTCTCGTTTCATCGAGGAGCGGAGCGCTCGCCCTCAAGCAGTGGTGACTACCTCGT
ACAAGTACCGGCCGCGAAGAAGGTGAAGTCGGGCAACGCGGCGCGGGATCGCGCGCCACAGCCAGCCAGGCGGAGGAGGGCGAC
AAGGTGCGGGGACGAGCGGCCACGCGGGAAGCAGCCACGCGGGGGTGGCGGGCGGCGCAGCTCCAAGCCGATCCAAGAAGAG
60 CTGTGGCCCAAAGTGGCGGGGAGCTCGTGGCGAAGCCACGCTAAGCTGTGTCGCGGCGGCGGAGCAAGGCGGCTGATCGT
TCTCTCAGAGCAAGCTGCCCTGTGTCGCCCTTGGGGAGCCACGCGCGTCTACAAGGTGCGGACTCCCCAGTGGCCACTCCGGCC
GCTCTCCTCGCGCTCAGTGCAGTGCCTGGCCACCCAGCCAAACACCTCGCGGACAGAAGAACTGACGCTGTACCTGTTTGAAG
CTCGGGCGCTGCGCGTCTCCGTCGCGGGGCTGGGTGCGTCGCGCAGACCCAGTACCTCACTGGGTTGTACGAAGTAGGGCC
CGGGATGCTCGCCGATGGCCGGAGTCTGAGCGGCCGAGCAGCGCAGCATCATCGCCAGCGCCGAGCCGATCGCCCGTGAACAC
65 CGCGGCTACGCGAGCTACGCGCAGCCTCGCCGCGCCGCTCAGCGCGCGCTCGACCGAGCTCCTCTCGCTCTCTCGTCTCTTCT
CTCTCTCTCGGGCTCTTCTGTCTCGCAGCAGAGTCTCGAAGACGACTGCTGACCTGAACCTGAACTCAAACTTGAAGACATGT
CCCTGGGAGTTTCAAGTCTCTATCGCGGCTCAGTCGGGACTGGAATTTAACTTCGAACCCGGCTCAGGCTCCCACTTCGAATTC
CCGGAATTATTCACGCGCGAGGTGAGCGAGATGATCTCGGGAGATTGGCTGGAAGTCCAGCATCTCTAACTTGTCTTCACTACTG
AAGGAGACGCGGGCCGGGAGAGGTGGCCAAAGAGGCAGGAGAGAGAGGAGGAAAAAGAAACAAAAAACAACAAAAA
AAAGA

442

443

444

445

HUMAN SEQUENCE - mRNA

[illegible]

AGTTTGAAGACGACCTGCTCGACCTGAACCCAGCTCAAACCTTTGAGAGCATGTCCCTGGGCAGCTTCAGTTCGTGTCGGCGCTC
GACCGGGACCTGGATTTTAACTTCGAGCCCGGCTCCGGCTCGCACTTCGAGTTCCCGGACTACTGCACGCCCGAGGTGAGCGAGAT
GATCTCGGGAGACTGGCTCGAGTCCAGCATCTCCAACCTGGTTTTCACCTACTGAAGGGCGCGCAGGCAGGAGAGGGGCGGGGG
GGGTAGGAGAGGAGAAAAAAGTGAAGAAAAAGAAACGAAAGGACAGACGAAGAGTTTAAAGAGAAAAAGGAAAAAGAAAGAA
5 AAAGTAAGCAGGGCTCGTTCGCCCGCGTTCGTGCTCGGATCAAGGAGCGCGGCGCGTTCGACCCGCGCTCCCATCCCCAC
CTTCCCGGGCGGGGACCCACTCTGCCAGCGGAGGGACGCGGAGGAGGAAGAGGTAGACAGGGGCGACCTGTGATTGTTGTTA
TTGATGTTGTTGTTGATGGCAAAAAAAGCGACTTCGAGTTTGTCTCCCTTTGCTTGAAGAGACCCCTCCCTCCCTTCCAAACGA
10 GCTTCCGGACTTGTCTGCACCCCGAGCAAGAAGCGAGTTAGTTTTCTAGAGACTTGAAGGAGTCTCCCTTCTCTGCATCACCAC
CTTGGTTTGTGTTTATTTTGTCTTCTGGTCAAGAAAGGAGGGGAGAACCCAGCGCACCCCTCCCTCCCTTTTAAACCGCTGAT
GAAGACAGAAGGCTCCGGGTGACGAATTTGGCCGATGGCAGATGTTTGGGGGAACGCCGGGACTGAGAGACTCCACGACGGCGA
ATTCCCGTTTGGGGCCTTTTTCTCTCCCTCTTTTCCCTTGCCTTCTGCAGCCGAGGAGGAGATGTTGAGGGGAGGAGGCCA
GCCAGTGTGACCGGCGCTAGGAAATGACCCGAGAACCCGTTGGAAGCGCAGCAGCGGGAGCTAGGGCGGGGGCGGAGGAGACA
CGAAGTGAAGGGGTTACCGTCAAACCTGAAATGGATTGACAGTTGGGGAGCTGGCGGCGGCGGCTGCTGGGCTCCGCTTCT
15 TTTCTACGTGAATCAGTGAGGTGAGACTTCCAGACCCCGAGGCGTGGAGGAGGAGACTGTTTGATGTGGTACAGGGGCGT
CAGTGGAGGGCGAGTGGTTTCGGAAGAAAAAAGAAAAAAGG

HUMAN SEQUENCE - CODING
ATGGTGCAGCAACCAACATGCCGAGAACACGGAAGCGCTGCTGGCCGGCGAGAGCTCGGACTCGGGCGCCGGCTCGAGCTGGG
AATCGCTCCTCCCCACGCCCGGCTCCACCGCTCCACGGCGGCAAGGCCGACGACCCGAGCTGGTGCAAGACCCCGAGTGGG
20 ACATCAAGCGACCCATGAACGCTTCAATGGTGTGGTCGAGATCGAGCGGCGCAAGATCATGGAGCAGTCGCCCGACATGCACAAC
GCCGAGATCTCAAGCGGCTGGGCAACGCTGGAAGTGTCTCAAAGACAGCGACAAGATCCCTTTTATTGAGAGGCGGAGCGGCT
GCGCTCAAGCACATGGCTGACTACCCGACTACAAGTACCGGCCAGGAAGAAGGTGAAGTCCGGCAACGCCAACTCCAGCTCCT
CGGCCGCCCTCCTCCAAGCCGGGGGAGAGGGAGACAAGTCCGTGGCAGTGGCGGGGCGGCCATGGGGGCGGCGCGCGGCGG
25 GGGAGCAGCAACGCGGGGAGGAGGCGGCGGTGCGAGTGGCGGCGGCCAACTCCAAACCGGCGCAGAAAAAGAGTGCAGGCTC
CAAAGTGGCGGGCGGCGGGCGGTGGGGTTAGCAAAACCGCACGCCAAGCTCATCTGGCAGGCGGCGGCGGCGGGAAGCAG
CGGCTGCCGCGCGCTCCTTCGCCCGCAACAGGCGGGGCGCGCCCTGCTGCCCTGGGCGCGCGCGCGACCACTCG
CTGTACAAGGCGCGGACTCCAGCGCTCGGCTCCTCGGCGCTCGGCTCCGCGAGCTCGGCTCCGCGAGCTCGCGGCGCGGCGCAAGCA
CCTGGCGGAGAAAGGTGAAGCGCTCTACTGTTCCGCGGCTGGGCGAGTGTGTCGCCCTGGGCGCGGTGGGCGCGGGAG
30 CCGACCCCGAGCAACCCCTGGGCTGTACGAGGAGGAGGCGCGGCTGCTCGCCCGACGCGCCAGCCTGAGCGGCGCGCAGCAGC
GCCGCTCGTCCCCCGCGCGGCTCGCCCGCGACCCGCGGCTACGCCAGCTGCGCGCGGCTCGCCCGCCCGTCCAG
CGCGCTCGCAGCGTCTCTCGGCTCGTCCCACTCTCTCTCTCTCTCTCGGCTCTCTCTCTCCGACGAGATTCTG
AAGACGACTGCTCGACCTGAACCCAGCTCAAACCTTTGAGAGCATGTCCCTGGGCGAGTTCAAGTTCGTGTCGGCGCTCGACCGG
GACCTGGATTTTAACTTCGAGCCCGCTCCGGCTCGCACTTCGAGTTCCCGGACTACTGCACGCCCGAGGTGAGCGAGATGATCTC
35 GGGAGACTGGCTCGAGTCCAGCATCTCCAACCTGGTTTTCACCTACTGA

Table 20

MOUSE NOMENCLATURE	
ICSGNM	Tcof1
Celera	mCG6035
HUMAN NOMENCLATURE	
HGNC	TCOF1
Celera	hCG38609
MOUSE SEQUENCE - GENOMIC	
1	TTAAGAAAGCTGGGGCCACTGGACAGTGGTGGCCACGCCTTTAATCCCAGCAATTGGGAGGCAGAGGCAGGCAGATTTCTGAGTT
5	TGAGGCCAGCCTGGTCTACAGAGTGAGTTCCAGGGACAGCTGAGACTACACCGAGAACTCTGTCTTGAAAAAAGAACTGAAGG
10	AGAGGAAGAAGAAGAGGAGGAGGAGGAGGAATTNN
15	NN
20	NN
25	NN
30	NN
35	NN
40	NN
45	NN
50	NN
55	NN
60	NN
65	NN
70	NN

449

450

451

TCCTGTCTACCACTGGAAGCCCTGGGGAGTTTGAGCCTTTTTCATGCTCAGGCTGTTCTTGAAGAACTTTGCATACACCCCTTCT
 CTGCTTGAGCATTGCTGGCTAGTTAATGAGCCGACAGTCTCACAAGCCAGTGTCTGTACCCACAGAACAGACTATTCCAGCTAA
 GGATTTAAACATTTACGTGCTAGGGCTCTGTTTCAGGGCCAGAATGAAGGCCACTATATGGTGTCACTGGGTGCTAGGAGGTCA
 5 GCTCAGGAAGCCCGAGGCCAGCCGGGGTGGCTGGGGCACCAGTGAAGATGAGAAAGGAAAGTGTATCTCCAGAACCTCTGGGCTT
 CTTCTGATGGCATCACCTAAGGACTGAAAAGAAAGAACGGGCTATTCTTTCTCTTACCAGGTAAAGACCTCTGGAAAAGGTCCC
 CATGTGAGAGCCGACTCGGTGCTGCCAAGGGGATCTCTGGGAAAGGGGCCATCTTAGCAACCCAGGGAAGACTGGGCTGCAGC
 CACCCAGGCCAAGGCAGAAAGGCCAGAGAAGGACTCGGAAACCAAGCAGTGAAGGACGATTCTGATAGTGAGGATGAAATGCCAGTCA
 CTGTGAATACTCCTCAGGTAAGCCTGGGGGAGAAGGGAGGCATTATAGCCAGACCTGAAGGCTGCTAACCTGTCTCCTCAGCT
 10 GGTCCCAGCCCTGTCCCTTCTCCTCAGCTGGGCCCAGCCCTGTCCCTTCTCAGCTGTGCCAGCCCTGTCCCTTCTCAGCTGG
 TCCTAACCCGTCCTTCTCCTCAGCTGGGCCCAGCCCTGTCCCTTCTCCTCACTGGTCTTAACCCCTGTCCCTTCTCCTCAGC
 TGGTCTTAACCCCTGTCCCTTCTCCTCAGCTGGGCCCAGCCCTGTCCCTTCTCCTCACTGGTCTTAACCCCTGTCCCTTCTCCT
 CAGCTGGGCCCACCCCTGTCCCTTCTCAGTTAGTCCAGCTCCCATCCCTTCTCCTCAGCAGGTCCAGCCCTCATCCCTTTT
 CTGGTAAGGCTCCCTGCTCCTGTGAGTCTCTGCCCATCTGCTTAATGATTACTCTCAATTTCTCATACAGGCAAGGACTT
 15 CTGGGAAGAGCCCTCGGGCCAGAGGTACCTCAGCCCCGCCAAGGAGTATCCAGAAAGGGGCTCTGCAGTACCCCTGGAAAG
 GCAAGGCTGTGGCAGCCAGGCAGGGAACAGAAAGCAAGAGCAGTGAAGGAGTGAAGAGTGACAGTGGGGAGACACAGCTGC
 TGGCACTCTGACCAGAGTCTGCCAAGGTGAGGCCAGGTGTGCTTGTGCTGTGCTAGAAAGGAAGGCTCTCTTCTTCAAAAC
 AGAGCAGTCCCTGATCTTGCCCTGTGCTACTCCAGGTGAACCTTTGGGGAAGAGCTCCAGGTGAGACTGTTTCCACCGTC
 ACCCCGGGGTCTATCGGAAAAGGTGCCAACCTGCCCTGCCCTGGGAAGGTGGGGTCAAGCAGCTCTCAGGCTCAAAATGGTAAAGAA
 AGAAGATGTCTCGGAGAGCAGCAGTGCAGAGCTGGACAGTGACGGGCTGGGAGCCAGCAGGTGAGTCTCAGAGGTCTCAGC
 20 CCGGAGGCTTACATGGCCCTACACCCAGGTCTGTGCTGTGGTCTCTAATTGTCTGCTGTCTCTACCTGGGGTCCCACTGATC
 TCATTCCAGGCAAGGCTCCCTTGGCTCCCTCAGAAGGTGAGGCTGTGGCCACCAGGTCAAGACTGACAGGGGCAAGGCCA
 CTCAGGGAGCAGTGAAGGATCATCTGACAGCGAAGAGGAGGAGCAGCAGCAGCTCTGCTGTCTCAGTGGGGACCAGGGAAGAGA
 GGCAGTCTGGCTGTCTGGCCCGCCAGTCAGAAACCCCACTCTCAGAAATAGATGGGTCTGTTGTAAGGAGACACAGGGGG
 AGCTGCATCTCAGAACGAATTAGTCCAGGAGTCTCCCCAACCTCCATCTGCACTTTCTCCAAGGCTAAGCCAGCTCTGGAAG
 25 CAGATGAAGGCTCTCTCTAGGAAGGCAAGGCTGTATCCGCAACAGGAGCGAGCAGCTCTGCTCCATTGTAAGGCAAGGAGCGGTGAC
 CTCTTCCAGCAGCTGTCTATCCCACTCTGGCCAGGCAAGGAGGCTGAGAGTGTGGACTCTTCCAGTGTGAGTCTTCCAGTGTG
 GAGCTGTCTCCAGCAGCCCAAGGTACAGGTAAGGGCTGAGATTACCAGGTAGGCTCACTCCAGCCCTCATGGGCTATCTG
 CCCTTGAGAACTCTTTCTCTCTTACTTTCTAGGGAAAGTCTGGGGTAAGGGCTCCAGGGAAGCTGCTCTGGGGCAAGG
 GGTGGCCCAAGTGCACACTCAGAAGCAGGGCTCTTGGCTAAGCTATGGCTCAGGAAGACTCAGAGAGCTCTCAGGAGGACTCCA
 30 CAGTGAAGGAGGATGAGACCCAGCACAGGTGAGGTAGGGAGGAAGCAGCCTGAACCAAGACTGGGGATGAGCTCAGTGGAGG
 CTGCCCTTGGCCCTAGGAGCAGAAATCTGGGACTCAGGCTCAACTAAGTCTCAGCTTCTCAGCAGCTCTTGTCTTCTGAGCCCC
 CTGGCTCTAGGTTCTACACATCTGGGTGTGCCAGCATTCTGCCACTGCCACTTAGACAGAACTGTGGCTTGGCTTGGG
 GAGTGTGCCACCTGGGCAAGGTGTGATATAGTACACCCCTTACAGCAGGATAGGGATGTGAGTGGGCTAGCCAAGCATGGTA
 CCGAGATATTTAAGAGGAGTGTCTGTGCTGAGGAACTGAAAGTCTGCTGGTGAAGTGAAGGGTGAAGTCTTTCAGAAAGCCA
 35 AGAAAGTTGGCTCGGGTGCACCAAGCAGGATTAATGGCAGAGGCCAAGAGCCAGGTTACCTGGGCTCAAGTCCAGTTCTATT
 CTGGGGCTTGGCTACAGTCCCATCTGTCTCATCACTCAACCTTGTGGGTATGGGTAAAGGCTCGCCTGCCGAAAGCCGGGAGC
 TGCCTTCTGGCCGTGGGCTAGGCTGTGGGGCAGAGTTGCAAGGCACACCCTGCCCGAGAGAGCAGGAATGAAAGGAGC
 TTGTACGGTCTGGCTATGGGGGACCTTCTTAAGTCTTAAGTCTGTGCTACATGAGAGGCAATTGGGAGTTGGAGCTACTTTG
 AAATAAGTATGGTGATATCTGAGTGAGTGGGGCTTCTCAGGTCCACACTCACCAGATTGCACTCAGAGCTATCAGTGTG
 40 TGTCTTACTCTGGCTGAGGCCATAGCTCTAGCTGGGTGATAGTGTTCGCTACCATGCACAGGCGCTGGGTCTCATCTCGG
 CACAGCACTGACTCCGTATGTGGGTTTGTACAAGCTGAACACCTGACAGGATGGGGGGGGGGTGAAGTAAAGCAGAACTAGAC
 GACTCTGTGTTCTGTTAACTCTGCCAGTTCTGCTTGGGCTGAGACGATGCTTGAAGTCTGCACTTCAAGGAGAGAAGAA
 GCACAGATTGACGATTCTATATGGCACTCAGCTTCCATCTGTAGAGTGAATTAATGACAGACAGGAGTCTAGTTGAAAGGGA
 45 ACCTAAAAGCAGTTGTGTTTGGGTAGGAGTATATTTAAAGGCTTTACAGTGTGTAATTTGAGTGTGTGTTAGTGCCAGTTAGAC
 TACTTAAACAGTGTCTGTTAATCTTTGCTTGGCTAGATATGTTAATTTTATGAGTCTCTTTTATGAGATGGAAGTG
 AGGCTGGTAAAGATTAAAGTGGCTTCTTCTGGTTGTGTTTGTGTTTGGAAATCAGGTCTCACTGCATAGCTCTGGCTGTGATGGA
 CTGCTCTGTAGACCAGGCTGGCCTCAGACTCAGAGAGTATGACTATCCCTGCCCTACCAAGTGTGGTTAAAGGTGTGCACTGCC
 ATACCTGGCATCAGGACTTCTTTTCTTTTCTTTTCTGAAACAGGGTTTCTCTGTGTAGCCTGGCTCTCCTGGAGCTC
 50 ACTCTGTAGCCAGGCTAGCCTCGAACCCAGAAATCTCTGCCTCTGCTCCCAAGTGTGGGATTAAAGGTGGGCACCACCATC
 GCCCAGCAATCTTTTCTTTTCTTTTCTTTTGGGTTTGGTTTCTCAAGACAGGGTTTCTCTGTGTAGCTCTGGCTGTCTGGAAC
 TCACTCTGTAGACCAGGCTGGCCTCGAACTCAAAATCCGCTGCTCTGCTCCAGTGTCTGGGATTAAAGGTGTGTCGACCA
 TGCTGGCTTGGCATCAGGACTTTTCTTTTAAACATTATTTTATTTATGTATGAGTACACTGTAGCTGTCTGCACACA
 55 TCAGAAGAGGCAATTGGATCCATTACAGATGGTGTGAGCCACCATGTGGTGTCTGGGAATTGAATCAGGACCTCTGGAAGAGC
 AGTCAGTGTCTTTAACCCTGAGCCATCTCTCAGCCCAAAATATTGGTACATCTTTTCTTTTCTTTTGGCTTTTCTCAAG
 TCAGGGTTTCTGTATAGCCCTGGGCTGTCTGGAATCACTCTGTGGACCAGGCTGGCCTCGAACTCAGAAATCTGCCCTGCTC
 TGCTCCCAAGTGTGGGATTAAAGGCATGCGCCACCACTGCTGGCTGGCATCAGGATTTCTTAACTCAGCTGTGTAGT
 60 TGAAGGAGGAGGAGCAGCATCGGCTCAGTGTCTGAGCATCAGTGTCTTGTGACTGCTCTGTGTCCTTTGGCTTCTCAATTC
 CCTTCTCTTCTTCCAGGCCAGCCTTGGGAGACTTCTCAGGCCAAGCCAACTCCCACTCAAGACACCTCCAGCGTCT
 GCATCTGGAAGAGCTGTGGCTGCTCAACCAAGGCAAGTAGGACCAGAAACCAAGATACGTTAGGATAAAATCTCAAAATCTGT
 AGTCCACAGTGTACAGCATGGACCACCGCTGTCCACCCCTGTGATATTACAGCCACACACTAGTAGAAGGATGACTCGCCG
 65 CTTTCTCTCTCAATACCAATTGCTACTCTCAGTTACAGGAAACCACTGTTCCGAACAGCAGCAGTCTCTGCAAGGGCCAGCG
 CTCTGTGCTCAGCCGGGAAAGCAGGGGCCAGCAACCCAGGCCAGAGGGTCCCGTGGCTGGCACAGGGGAGGACTCAGAGA
 GCAGCAGTAAAGAGGAGTCTGACAGTGAAGAAGAGACGCCAGCCAGGTACCCACCCAGCTGGACTGGGGTGAAGACCATGTG
 TTTTGGCCAGGCTATAGGCACACTTGACATGCTCTCCCTTGTGTTTCTCCAGATAAAACCTGTGGGGAAGACCTCTCAGGT
 CAGAGCTGCTCAGCCCTGCAAGGAGTCTCTTAAAGAGGAGCCATCCAGGAACCCCGGCAAGAGCGGATCTTCACTATCCC
 70 AGGCCAGCAGGGAAGACAGAGGACTCAGACAGCAGTGTGAAGAGTCTGACAGTGAACAGAGATGCCATCAGCCAGGTGAGC
 TCTGCCAGGCCGAGAGCCACCGTCACTACTGCTCATAAACAGATCGTCCCAAGAGGGGAGAAAGAACAGATAGAAGTCTCTA
 ACTCCAGGATCTTGTCTCCAGGTCTCTCCCAACATGCCCTGGATGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGTGAAGT
 TAGGACATCTAGTACTCTACAGTCCGAGGGGCTCTGCAGCACTGGGCACGGAGTCCCATGCAAGCTGAGTCAAGTTCTG
 75 CTGAGGAACCTGTGAGCCATCTGCAAGACACCCCTGTGAGTCAACAGGAAGCTTGGGCTACGGCGCAAGTCTGTGCTAAGAA
 GGGCCGCTCTGCTCAGTGTGCTAGGCCAGGAGTGAAGAGAGAGAGTGTCTCATACTCAAACTTGTGCTCAGTTCTC
 GGCCCGGTTGGTTGACGAGCAGTGGGCTGCTCTGGCTGACAGTCTCTAGTCTGAGCTCAGGAGCCTGGTGAATCGGTACG
 TGATGGCTCTGGTGTGCACCTTAGGGAGTGGCAGAGATCAGAAAGAAATGGTGGTCTTGTGAGTTTCAAGCCGAGCGT
 GCTTTATAGAAACAAAGGAATGTACATATAAGTGGAGATTTGTAGCTTCTCTGAGAAACCAAGTCTTCTTGGCCGATGAGC
 ACAGGCCACCGGAGCAGGAGACATAGAGCCCTTCTTGGGCTCTCTTAAGTTGGCATCACCAAGCTCTTCTTCACTGATTGAC

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75

AAGTTCCTGTGGCTTTGGACACCCGGGCCCTGAAGAATGCTCTTAAACAGGCGCTTAAGAAGTGTCACTCTTCGCAATTTTCCCTCA
CTGGGAACCCCTCCCGTGTACAGTGTCTTACTCAAGTCTTGTGCCCTCAAAGGATGTCTATCTCCAGCCTGCCAGAGGCCAAAGCGTC
AGGTCACAGCGTCCCCAGGAAGACATAGAAGGTCCTCAGAGAGCAGTGAAGGATCTCGCCCTCCGGCAGCGTAGGCTGTAGCT
ACTCTAAAGGCTGCCCTGGCTGGGCGAGGTCGCGCTCTCTGTGAGAGGGTGACGCTTCCCAACAGGGATAGTCTCACCACATGC
AGGTAGCACTTACAGCTCCTAGCTGTCTCTGTATACACTCTGGTGTGGTCTGGGCTCAGGCTTACACACCCCTGGCCCCACTCTG
CTGCCAGGAGGCTTTAGGACTCTGATGTTTATGTAAACTGGAGTTGGTCTAGTGTGCCAGGCACCTGCTGAGCACTGTTAGG
CGGGCAGCTTGTCTGGCGGCTGTCTGGGCGGGGTGAGGCCCTTATCTTCTGTGAGAAAGTTTGAAGAACCTCCAGAACAT
ACTGCCAAGCCTCTCTGGTCCCAGTGGACAGTGGGGCTCTAGATCTCCCTTGGCAGCTTCTGTTGAATCTGTGGGCCCCACCC
CAGGTGAGGCTATGCAATTTATGGCACCTGCTCATCTGCTGGTCCCCACTCTGCTGGCCTTGTCCCAAGGTTGAGGTC
GGGACACCTTCTGTATTTAGAGAGCCCAACATGATCACCAGATGGTACAGCTCTGTGTGAACCCAGGCTTGTGAGGAGC
ACTGCCCTCTTCTGAGGAGTAGGGTATTTCCATTGTAAGGAGAGAGGGGCTGTGACTCTGAGGCAGCTCAGAGAACATTTGAA
TCTGGCAGTCTGCACTTTCTCTGCCAGCTGTCTTTAGCCCCCTCAGGCTTGGCTTTGCCCTCTGGCTCTGCACTCTT
CTGAGTACCTCCCTCACTCTCAAAGACAGACAGCAGTATGGAAGTGTGAAAGTGTGTTTCTGTGTGAGTAGACTTGCACAT
TTAAATAGACATTATGTCTAAATTTGAACCTTTAAAGTGGTCTGTGAGATCTGGGGGTCTCTATTTTGAACAAAAACAAAGCCAA
AATTTCTAGTTCCTCAGAAGGAATTCAGGGAACCGGCACAGCCAGGAAGTGTGGTTCCTCTGAGGAGAGTGCAGCTACG
CGGGATTGTCTGCTGTGGGCACTTTAAGACATTTCTCTATGGAGAGCTGCAGATGGTCTCTCTAGGCTCCCCGTCTGGT
TGTTGTTTTCATTAGCCTGTCGTGGGAGAAAGCCGGGTGATCAGCTCTGGGCAGCTCTGATCCAGGTTCTGTCTGTGAG
CTCTGTGTAATGCCGTGTGGAGTGTAGCCCTCAGCTGAGGCTGGTGGAAACCCGGGTGGCTACAAGTTAGAAAGAAAGTGGGCAT
TGAGGTAATGACGAGCAGAGCGGATGGCTGATCATTCTGTGTAGGAGCTGCAGATGGTCTCTCTAGGCTCAGCCAGTACGCT
AAGCTCCAGCTAAATATTATTAATGTATCAGCGTTTGGCTGAGTATGTATGTATGTGACACACATGCTGCCCGGTGGCTG
TGGAGACGAGAAGAGGGTGTGAGATCCCTCTGGAACATAGAGGTACAGACAGTTGTGAGGTGCTGTGTAATGTAGGAATCAAAC
CAGGTCCTCTAACTCCGAGCCATCTCCAGGCCCTTAAATGTTTAAAGGCTACTTCAGCTGTCTGTTGCGGAAACAAAGG
CATAGGCTCTGTCTTATGTAGTGAGAACAGGGGGCTGTGTAACAAAAATCTAAATTTAGAATTAAGTCAAGGCTGTGATGTT
AGGTCTGGCTCCAGAGCGCTTCTCTCCAGTCTGTATCTTGAACACAGTTTGTGGTGTCTGTGGACGAGGTGCTGTGCCACTCT
GAGAGCTCTCAGCTTAGCTAGCTAGCTAGGCTGGGTTTATAAATCTCAGGCTCTCAGTCTCTAGTCTGAGGCTGAGGAGTGT
GTCTCATGGGAAGGATGAGGCCAGGTAATAGTCTTCTCTCTCTGGGGGCGGGAGGAGTCTCAGGGGTGGTCTCAGG
GCTGAGGACACCCCTCCATGCACTGCACTCTAGCCCCACAAGCTGCTTGTAGGGAAGCTCTCGGTGACTGTCCCTTGCACA
GAGCTCCACTCCCTCTCTGCCCCAGACATTAAGTGAATAGTAGAGAAGCCAGCTAAGACAGCGGGGACGTGGGCGACCGCCCA
AAAGGGCCCCAAATCTGCTTCTGTAGACATCTTCTGCAATAGGTAGGTTACCCCTAATCTGCTCTCAGCACCACAGGGGG
TGGAGGTGAGATGCTCAGGTGGTGTGGTGTAGCTGCTCTCTCACCCTTTGGCTCTCTGATCAAAGCACAGCCACACCCACT
GGGCTTTGTGCTTCTCCAGGTGACACAGCAGCAGCCACACAGAAATGAGGAGCAGAGGGGCTACAGACCTTAAGCACTGCCCT
GTGCCAGCCACCCCTCAGCAGCGCGTCTCTCTCTGCTGCTGCTCTCTCTCTGCTCTATCGCTCAGCACTGCTGTGCTG
TCTCTGCTCAGATGGGGTGGTGGGCGAGTGGGCTGAGGAGGCTGTGGTGTGAGAGTGTCTTAACTTCAAGACGCTAT
TGTGTGCTCAGTGGTGTGTGCTCTCTTGGTCCCCAACAACTGTGTTCTGTCTCTACATATATAGATCCCCCTCCTCT
CCACGGCAGGCTTCTCCACTTCCATCTCTCTCTCTCTCATCAGCTGGGAGAGGCTCTGGAAGTGGCAGCTCAGAGCAGC
CGGGGGGAGGCTGTCTGGCAGGTGAGGAGGGCTGAGCGCAGCGGTGGCGCGCCACACTTGGTGGGTACCATAGTGTCTAAAGT
TTGTGCTTCTCTGTGTCTCAGAGCCCTGGGGCGGTGGGAGTGTGTAAGCAGCTGAGGAGGAGGTGTCCGTGGATAGAGA
CCAGCTACCCCTCAGGACGCTCTCTATTAGGACAGACCAACAGGCTCTCAGGCAGCACTGGGCTTTGGAGAGTAGAAAGTGA
ATTCTAGTCCCTAATCTAGCTGCTCTGTACCTCTCAGCTAGGACTGAAAGGAAATAGATCTGGAGTCCCTGGTGTGTTGGT
GACATATTTGGGAATCTGGTCCACTGCCAAATGACCTCCAGTACTAGGATCTGCTGCTGCTCTGCGCTCTCAGTGAGATACAG
AGCAGACCCAGAGTGAAAGTGCATCAGGCGATGTAGAACATATCTGTAATCCAGCACTCAGGAGACAGGATAGGAATATCAGAG
GCCAATGTGTTAGGCTATACATAGACACTGTCTCAGGATTAAGAAAGTAAACTGAACCTACGCAATATCCCAACCTGCACT
GTCCCGTCTGAGCAGGTTGGCTTTGTGCATCTTACTTGAGTCTTGAAGCTGGTCTCAGGCCGTGACGTCTATCCA
TCAGAAATTCATATGCAACTCAAAATGATAAGAGCTTCTAGTCTTGTGATAGACAAACCAAGACAGTATCTCGGCTAGAAAG
CTGACCGGACAGGCGCTTGTGCTGTTTCTCAAAGTATCTGTGATGAGTGCACTTTTCAAGTGTCTGCTGTTTAAAGTG
AGTCTAATAAAGGTTAGTATGTGGAGATCTGTTCTCTAATTTCCAGCAGTGGAGGCAGAGGCAGGTAGATTTCTCATCCAAG
GATAGACTGTGCTACAGAGCAAACTGTCTCAAAGCAAAATAGGGCCACATATACATATATCTGAGCGCTCTAGTCTGTTGG
CTGGCTACCCACTCCCAACCCCTGTTACTCCAGGAGTTGTGTATGACTAAAGAACTATTCAGTATAACTGGGCTCTGATGCT
GAGCCACATCTCAGGAGGATGTCTGAGGCTCTGCGGGGAGGACCAATGAGACTCAGGGAATCATACAGTACACGTGTTAC
AGGAAATGCTTTTGAATTTCCCACTCAGCAGGTGGCCATCTGATGTCACTAGAAGAAAGGCTAAATTAGACATCCAGCTCTCG
CTCTGTTCTCTTCCATGTGCTGTGTGGCTGTGGCTGGGCGTCTCTCTCTCCCTCTGGACTTAAGCTTCTCTGTAGGCGAGTGGAG
TGGGTGATACCTGTAGCTTGGGCTCAGTGAAGGTGAGTGGGCTCAAGAGCTTGAAGTGTGAGTGTGCTGTGCTGGTGTCTG
GCTGTTATGGGGTGGGAGTGGGCTAGAAGACCCCACTCTTGAAGTTGCAATTAAGACCCCTCTCTACCCCACTTCTCTCTCC
CCTTCTCCCTGACCAAGCTTTAATCAGAGGCGGATGTTTGTGTTTGTGTTTCAAGGCGATTAATCCCTCCAGTTTCTGTCA
ACCTGACAGTAGTGTCCAGTGTCCAGCTCTCAACCCAGAGGAGTTCAGGCTGTGAACACCAAGAAAGGCTCAGGACCACT
GCCAGAGCTCTCTCTCTGAGAGTGAAGGAGGGGACGAGGACTTGATTCTGCCACACAACCTCCACCTATGGTAAGCGTGTGCTG
CAGTGGGTGCTGTTTGGCGCAGGACGGGCCCCAGCCAGCAGTGCCTCCCACTGAGGCCAGAGGCACTAACAGGTTGGGCTAGCA
GAGGCAATTGGCGAGGACTGGGACCTGAGCTTAGGCACTGTATGTTCTTAAAGAAAGCTGCTGTGCTCTATTGTTGAAGGA
ATTACATTGAGGCTCTGTGTGTGCTGGCTCCAGGCTGAAAGCCAGAGGGAGCATTCTGGTGGCTACAGGAACAGGCTAGTCTAA
ACCAGACTCTGCTATAGCCACTTGGCGGTGGGTTACATATTAGCTTGGCAGTAGCTTCACTCCCTTAGCATAGAAAGGAG
ACAGTTAATCTTTATACCTATTCTCTCCAGCAACTAAGTGTAGTGTCTTGTGATGTTGGCGAGGCCCTTGAATCCAGCACTTGGGAGGCAGAGGC
TACTGTTCAAGTATATATGACAGACTGTGTGTCGGCGGGGTGGTGGCGAGCCTTAAATCCAGCACTTGGGAGGCAGAGGC
AGGCGGATTTCCGAGTTTAAGGCCAGCCTGATCTACAAGAGAGTTTCAGGACAGCAGGCGTATACAGAGAAACCTGTCTCGAA
AAACCAAAAAAAGAGTAAAGAGGACACTGTGCTGTTAAGTATGGACAGCAAGATCTCACTGCTCAGCAAAATCTGCT
TTTATTTGGCGAGTAAAGTGTGATAGGCTCACTAGGCTGTGGTGAACATCTCAGCACCCAGCAGCTCTCCCACTGGT
CCTAAGTGAAGCAGTTGCTCACTGTGACCTGCACAAGAGAAAGATGAGGTTAAGGTTAGGCTTGGAGTACCCGCCACAGCAGCCATTTTCA
AAATGACATGTTGACAGCTGCTGTCTGGAAGGCTTGGGAAGCCAGCGTCCCCCTTATGATCCCTAAGCTCAGCATAGTCCGAGG
AAGAGTATCTGGTAAATGCTTGTGCTGGGAGTCTAAGGCTTGTATCTGATGTGCCCCCTCTCTCTCGTTTCACTGCTCAGCT
AACCAGTGTGACGACGCGCGCAGCCCTCTCAGGAGCAGCTTCCCAACCCAGCAGAGTGAAGTGTGAGTGTGAGCGGATGCCAAAGGCA
AGAAGCAAGGCGCGCGCTCCGCTCAGGACTGTCTGGGTGAAGAGGCTGTGGTGGGCTCACTCTCTGCTGCTTGGCATGTG
TCTCAGGCAAGCAGCCAGCTCAGTACTGTCTCCAGCCCTGGCACTGATCATCAGGCCAGGAGCAAGCTCCCAATCCATGT
GTGTTGTCGGAAGAGCGGGCTGGGAGCCGGAAGCGGAAGCCCTGTCTCCAGCTTGCCTGAGTGTGGATTGTTTTCT
GGATTGAGACGCTGAAACCGACTCTGAGTTGCTTGCCTCTTAGTATCTGTAATGGAAGTGGCTTACTGTTTCTCCAGCCT
TCACAGTCCAGTGCATTATTAATATCTAGGCGAAGTATAGTGCAATATCTAAATAAACAGGCTCATCCACAGGCTTGTGCT
CAGGCGAGAACTGGCTCTCAGCTCCAGCTTCTGCTGCGGCTTCTGCTGCGGCTTCTGTTAAACGTGAGGAGAGTCTATCGC

ACACCCAAACCCCTAAGGGGAGGAGAAGAAGGCTGTACTGAAGCCCTCCAGCTTCGGGGTGCTACTGTGCCACCTGTTACCC
GGTGCATCACAACTAGCCCAAAAGAGCCTCTGGCGGCGGGTGATCCAGTGGGTAGTGAGATGGCCTGAGCATCTGCCCTGCTG
GGCACCAGGCTGAGCAGGACGAGACCTTACCGAGTCTTAAACAGCAGAGACACAGCCATTACACAGAAAAGCAGCATAAA
TTAGTTGTTCACCAACTCTAGGTGTTGCAAGGGAAACAGCAGAGAAATATGGGTGACCTGCTTTAGAAAAGCGGGCAG
5 GAAGGCTTCTCTGGGAACATGAGCAGAGCTGCCCTGCAGGAAGGGAAACCCAGAGGTACTAGAGCCCTAGGTGATTGACATTAGGCG
GGGTAAGATAAAGTAGCAAGGGGGTCAAGCCATACCTGGAGTCTTTGTGTCTGCAGCTCCAGGAGGCTTAGCAAGGCTCATCTA
TTGTCTGTGTCTCTTCTGACTTCTAGCAGGATGGGAAGCAGGGGTGCCCTGAGGGACACCTAGCCAGGGAACATCCAGAGG
AGACACAGGCGATGGCCACTGGAGTGGGGCTGCGCTGTCTCCCTGGGCCAGATTAGAGAACAAGCCATAGCTCACCACCTG
10 GTACCCATCTTCCAGCTGCGATGGCTCTCTGTTCTCCACCTTGGCCCTCAGGGCTTTTCTGCTTGAACATCCCTGCTCTTTAC
CCATGCCAGTCATTTCTGGCTCAGGGTAGCACAGATGCTGTTCTGAGAATCTATGGGTCTCAGGGCTCCTCGTACCATCAGTGGGA
TAACAGAGGGACCTGGGTCTCTCCACTGGTGTGAAAGCTCATTCTTAAAAGCCAGTAAGCCGGGGCTGGAGAGATGGCTCA
GTGGTTAAGAGCACCGCTGCTCTTCCAGAGGTAATGAATCAAATCCAGCAAATACATGGTGGGCCCAACCTTCTGAAATAG
ATATGATACCTCTTCCAGTGTGTCTGAAGATAGCTACGGTGTACTTATATAATAAAATAAATCTTTTTTTTAAAGCCAGTA
AGCATGGGGAGGGGCAAGCTTACTTACTGTGCAAGCATGAGGCCCTGAGCTCATTCTCTGTACCCACAGGGGAAAGCCAGGCA
15 TGGTAGTGGGGCTTTGTAATCCAATAGTGGGCGAGTTAACAGCCAGCCTAGCTAATTTGGTGAGCCCCAAGTCACATTAAAAAG
ACAGAAGGCTTCATATGACTGGGTCTCTTCTGCTCCACCTCAGTGAAAGGCCAGCATGGTTGTGTGTAGTCAGCAGCCCTCT
TTACCTCTCTGGGCTCAGTGTGTAGTGCCAGGTAGGAGCCACAGTGCCACCCAGAGGGCTGTGGGAAAGCTAGAGAACCA
TGCGTAGTGCTTCCACAGTGGAGCTGGCTGCGGTGCTCTTCTCACTGTAACCTTAACTTGTGTTCTACTTTACCAAACTAGAC
CAGCAGTGGCGGTGGAACACTCCCCATGATGCTCTCCAGAGCGCACCCATCCAGCCCAAAGCCCAACAGCTCGGGAATCCA
20 AGCTCCCTGAGAAGCAGCAGCTTGCCCAAGCTACCCCAAGGCCCCAGGAGCTCGGAGGACAGCAGTGAACCTTCTCCAGGAC
GAGGAGGATGCCAAGAGACCCAGATGCCCAAGTGGGCCACAGGCTGGGTGAGGATTCCAGAGGGAGGGTGGGAGATGAGGCAC
AGCTGTGTAGAACTTAGGCTCTGGCTCTCTCAGCCACCTTGGCCTTGTCTCATCCCTGATAATACCTTTACAACCTTCAAGAG
CCAACCTGCTGTTTCAGCAGCTGGCAGCTTCTGGTATTAAGCTCCGGTTATTGAAGGCCCAAGTCCAGGACTGCTCTCCCTGG
GGGAGGGGGGGCAGAAAAGTGGGAGCTCAGGAACAGAGGGGAAATGATGCCATTCTGTGTGTGGGCTAGGTGCTCCAGACTAG
25 CATGGGTGAGCAGCAGGAGGCTTCTGTGAGGAGGATGAGGAACAGAGAAAGCCAGGCTCGGAGGCTCTCTGGGGAGCTCTGCC
TGGCCTGAATAACAGGGCCGCGAGGACTCACACTCAACGGGAACCTCTGCTTCCACACTAGATCCAGACCTTCCAGTAAGGAA
ACTGTGTAGAGGAGACCCCTACAGAATCCAGCGAAGATGAGATGGTGGCCCCCTCACAGGTAAGTCCAGGCGAGGCTGGAACCT
GGAAGCTGCTTTAGACTTCAAGCCACCCCTGGATGAGTGTCTAGATCCCATTTCCAGGGCCCTGGGTAAAGTCTGTCTAGTGGG
30 ATGAGCACTTCTAGGTCTCTTAAGGCTCTCTATACAGGACAGACTCCAGTACTTTCTCACGTGTGGGGAGTGGGTGCGTG
TTGGGCTCAGTCTCTCTTCCACTTTCAGGAAGGTTACTGGATTGTACTCAAGCTGTCAAGCTCGACTCGTGTCTAGTGCCTCTAC
CCTCTGAGCCATCTTGCCAGCCAAAAACGTTAACCATCTTCTGTGATGGTACTAGTCCATTGGCAATAAGAAAGTCCCTTTTA
ATGTGCTTACATATGCGTTAATTACATAGCTTAGAAGGCACAGCTGAAGGCCATATGTCCCGCTGGGCTCAGTCCGCGCCCT
CATGCTTGGCTGGGTGGCTGATCCGGGTCACCGACTGATCCCTTGAGCCTTGCCCTCTGGGATACGGCTAGGGGCTCGATGCG
35 TCTTTCACACTGGACTTCTCAGTCTCTCTCTCAGGTTACATGACTCCCGCTTGACTGTGGCTAATTCCAGGCTTCAAAGCT
ACTCCTAGGCCAGACTCCAACTCTTAGCTTCTCTGCCCGGCCACCAAGACAACCCGATGGCAAGCAGAACTCAAACTCCCA
ACACGAGCAGACACCGACTCCCTAAACCGGTAGTGGGACAGCAAGACATGGAGAAGCAGGGCTGTGCTGCTCTGCTTGTGA
TGGCAGCATTTGTCTGTCTCCCTTCAAGAGTCTCATATTCGAGCCTGTGGGGTCTCTGGGAACTAGAGGTACCCTTAAATGCA
40 GCTGGCGCCAGGACAGGTTGCCAGCTCTGGGAGCTCTGGGAACAGATATAGCCAGCCATTGGAAGCTATTTCTTAAAGCTTGT
GGAGGAGGCTTGGCTCTCCGTCGCTCCCTACTGACTTCTCAGTCACTGAGCAAGGGTCTGGGTATAGGGAACCAAGATGACTCA
GACTAGGCCAGCAGCTGTTTATAGAGATCAATACCTAGAGGAGACCTGGATAAGGGACAGGCTCTCGGGGGCTGCTCTGGCTC
ACACTGTGTAGCTTGAACAAGCTCTGTGCTTCTTAATCACACAAGTAAGAGCAATGCCATCGTGAGGCTCAAAGCTTCA
AGCATAAAGAAAACCTGTACATGACATTTGGAGGGACCCAGGGGAAGGAGTGTGGGAGTGGCCACATCCCTGACTTATATAACA
45 TGAAGCATCCGCTCCCACTCTGTCCGCTTCTCTTAACCGCACTCACTGTAGGGTTACAGCCCTGTGCCAGCATGTAGGCACT
CCTTGTGTGACAGGTGACTGGGAGGCCAGCGGGGTTCTGGGGCTGGTAACTTCACTTCCAGCTTCCAGCTTGGTGGT
TCAGAGGCGGAGCTGTGCTCACTTCTCTCGCAGTGTCTTGTCTATGTGAGAGGGGGTGCGAGCGACAAGGAGACATTTTGA
GGGGCTGTGGAAGGTTTTTTTTTTTTTTTACACGTGTAGTCAAGCAATATCAAAGGCAAGCAGAGGCTAGAAAATTTCT
50 AAACAAAGGCTGCACCAGAAGCCACTCTGGCAGGCAAGACCTGCTTAGTCAGCCACTGCATGCATACACAGCATCTCAGGAT
GCCCCCAATCTGCTGTGCCCCAGCTTGTGGCTTAAAGGACCATGGTGTGTCTACAGAGCGGAGCTGAGCATTTGTGTAG
GACCCCTCGTGTGTTATAACCCACAGTTTATGCGAGAGACATCATTTGATGTCTAGCTTCTTCTCTAAGGTGGGAACAGCT
TGAGGGACTGTGACGCTTGGAGGAGCTGTGACCTGGCCAAAGCCCTACACTAAGTTGATAAAGGCAGTCTTAGAACAGTGTCAAC
55 TAGTCAAGCATAGGAGACAGATAGAGCAGAGTACCCCTGGATCTCAGTTTCCATTTATGCAAGTTGTAAGTACACCCCTCAG
TTGTGATGATTTGTGCAAGATCTACCCCTCAGCTTTCAGACTTGTGACCTCCAAGACCTGTGATCTACAGGTAGGAAAGAGGCT
CCTCGGCTCCACGCTCAGAAAGCCCAAGAACTCAAGAAAGCACTCAAGCTCGCCGCCCCCAACAGACACTGCCAAACAGC
ATCACCCAGCGCTCTCTGGAGCAGGCTGGCCCCCTGAGCGAGGCGCAGGTGCAGGCTCTGTGGTGAAGGCTCTGACAGAGCTTCT
GGAGCAGGAACGGCTGAAGGCCACAGAGGCCATCAAGGAGAGTGGGAAGAAGAGCCAGAAGCGGAAGTTATCAGGGGACCTAGAAG
60 CTGGGGCCCCAAAGAACTTGAACAAGGGAGTGTGGTGGCAAGGGGAAGGGTCTCTGGCCCCCAAGGAGCAAGGAGAAGCCGA
AAGGCAAAATCAAAGCTTGAACAAGGGAGTGTGGTGGCAAGGGGAAGGGTCTCTGGCCCCCAAGGAGCAAGGAGAAGCCGA
CGCGAGTTGTGGGGATAAAGCTTGAAGATGGCGAGCAGAGCGACCCGAAGAGCAAGTCGAAAAAGAAAGAAATCCCTCAAGAGTA
AGTGACTGCTTTCCAGTACGCGCTGCGGTGCAACCTGGGTGGCAGGGCCCTGCCCGGCTCTTATCTCATTCTTTCCACAGAGA
ACAAGAGCCTGGGAAGTGGTTTGTCCAGAGTTTAAAGTGTCTGGTGGCAAGGGCAAAAGGAGAGTGTAGAGTGGCTGCGTCC
65 CCGTCCCCCAGCGCCCTTACAATGCCAGTATTTAGCCTCAGGGTTTGGAAAAACAACTCAACCCCGGCTTCAACAGAGGAGT
CTCTGCTCCAGCAGAGTCCACGGCCAGTCCCTGGGTGTGGAGTGTCCCTGGGTCTCATCCAGAGCCATCTTACTCTAGAAT
TCAGTTCTTTGGTGAAGAACAGCCATTGCTGCTTCCATGCGGAACTGCAACCCAGCAGGACTTCTGAGTCACTCAGCAGGCTG
GGCTCGGCGAGTGTGTTTTCTTTTCTAAGGGGAAAGCAGGCTCTGAGAAGGAAAGACCACTGGCGCTAGGCGAGTCCCTGCTT
AGTTTTGTCTTAAAGACAGGGCCTCACAATGTAGCTTGTACCGGCTGGAACCTTCTGTGTAGAAGCAGGCTGTTCTCAAATCTACAG
70 TGTGGCAGGAGATGTGTACCTGATCTCTCCAGTCTTGTGCTCTTCCCTCACACTCAAGATTAGATAGATAGACTTGCATAGTT
CTGAGGCCAGATTGTGTAGTCCAGCTCAGTAAGAGTGGAGCTGGCAGATGGATGGTATCCTGGCCCTATCAGGGCCTGATGTTA
AGAGCCGAGCTGCGTGGGCTCTGACGCTGACCTCAGTGTCAAAATCTATTGCTCAGGAAGTCTCGCTTTCTTCAAGCAGA
AAAAAAGAGCAAGGAGAAAAAGGAAAAAGAAAGAAAAAGTCCCTGGCCAAAGACTCTGCTCGCCGATCCAGAAGAAGAAAA
AGAAAGAGGTAGATTGAGTTCTGAGGGGTCTCAGGGCTAGGAATCAAACCTTCCCTTCTAACCTAGACAGGCCCCATGCC
ACCTTTCCAGTCCCTTAATCTAATGGACCTTGTGAGGAGGAGCAGGGGAGGGGTGATGGGAGAGACTCCACAGGGGCAAGTGG
75 TCAGCTTTTCAAGTGGCTGGCCAGCGGGAGCCCACTGAAGAAACAGCCAGCCAGCTTCTGGGATCAGAAGGCAAGTCTGCTC

455

456

CCGATCCAGCCCAAAGCCACCAACAGCTCGGGAATCCAAGTCCCTGAGAAGCAGCAGCTTGCCCCAGGCTACCCCAAGGCC
 CAGGAGCTCGGAGGACAGCAGTGACACTTCTTCGAGGACGAGGAGTGCAGAGAGCCCCAGATGCCAAGTCGGCCCCACAGGC
 TGGATCCAGACCCCTCCAGAGGAACTGTGGTAGAGGAGCCCCACAGAAATCCAGCGAAGATGAGATGGTGGCCCCCTCAGAG
 TCTCTCTCTCAGGTTACATGACTCCCGGCTTGACTGTGGCTAATCCCAGGCTTCAAAGCTACTCTAGGCCAGACTCCAATCT
 5 CTTAGCTTCTTCTGCCCGGCCACCAAGACAACCCGGATGGCAAGCAGAAGTCAAATCCCAACACGCAGCAGACACCGCACTCC
 CTAAACCCGGTAGGAAAGAGGCTCTCGGGCTCCACGCTCAGAAGCCCAAGAGCTCAAGAGAGCCTCAAGCTCGCGGCC
 CCCACACAGACACTGCCGAACAGCATACCCAGCGCTCTGGAGCAGGCTGGCCCCCTGAGCGAGGCGCAGGTGCGCCCTCTGT
 GGTGAAGGTCTTGACAGAGCTTCTGGAGCAGGAACGGCTGAAGGCCACAGAGGCCATCAAGGAGAGTGGGAAGAAGAGCCAGAAGC
 10 GGAAGTTATCAGGGGACCTAGAAGCTGGGGCCCCAAAGAACAAAGAAAGAAAGAGAGCAGCAGTGCACAGGGCAAGCGCTGTTTCC
 CCAGAAAGGCTCCCATGACTTCCAAGGCAAAATCAAAGCTTGACAAAGGAGTGTCTGGTGGCAAGGGGAAGGGCTCTCTGGCCC
 CCAAGGAGCCAAGGAGAAGCCGACGGCGAGTTGCTGGGGATAAAGCTTGAGAGTGGCGAGCAGAGCGACCCGAAGAGCAAGTTCGA
 AAAAGAAAGAAATCCCTCAAGAAAAAAGACAAGGAGAAAAAGGAAAAAGAAAGAAAAAGTCCCTGGCCAAAGACTCTGCC
 TCGCCGATCCAGAAGAGAAAAAGAAAGAAAGTACGCCGAGCTGCGGTGTGA

MOUSE SEQUENCE - CODING
 ATGGCCGAGGCGAGGAAGCGCGGAGCTGCTTCCCTCATTTTACCATCATCTGTTGCAAGCAGGCTACGTCCGCGCGCGCGGGA
 AGTAAGGAGCAGAGCGCGCAGAAAGTTCCTGACTCAGCCCGTCACTCTGGACATCTATACACACTGGCAACAGAGCTCAG
 AGCTTGGCCAGAAGCAGAAGGCAGAGGATGATGAGACCTTCAGGCTAAGAACTCTCGAGTGTCTGGATCTCTGTAGCAGCTCAGAG
 AGCTCGGATCAGGAGAAGGAGGAGGAGGAGCAGCAACGAAAGGGCCAAAGCCACCCCAAGACCGACACTGTCAATTTGCAACCGC
 20 AGCTTTGCCATCAAAGATAAAAGAAAGGAAAGACCAAGACAGCGTGAATCTGTGTCCGACCTCGGTCCGGAA
 AGACGGTGGTCCACCTGCTCTCTGGGAAGTCAACCAAGAGTCAAGAGAGCCCTTGGCAAACTGTCTTGGCTCAGAACTGAG
 GAGGAGGCAATGCCCAAGCCCTCGGACCCACTGCCAAGTCTGGAACGGTGTCAAGCGGCCAAGGAGCAGTTCAGTGAAGATTCT
 CTCATCTCAAGCGATGAGACAGATGTGAGGTGAATCTCCAGCAAAACAGCCAGGCCAAAGCTTCAGCAGCCCTCGGTCCGAA
 ATCTCCAGCAAGAACAGCCCCAGGCCCTTACCAAGTTAGGAAATGTGGCGCCACACCTGTCTAAACAGCCAGGCGGCGAGCGGCA
 25 GCTGCTGCTGCTGTGTGGTCTGCTGCTGCTGCTGACGACAGCAGAAAGTCTGAGAGCAGTGAAGGAGTCAAGAGGAGTCAAGAGCAG
 GGGCCCTGCTGGTCTGCCAGCCAGTAAAGCCTCTGGAAGAGTCCCATGTCTAGAGCCGACTCGGTGTCTGCCAAGGGATCT
 TGGGAAGAGGCCCATCTTAGCAACCCAGGGGAAGTCTGGCTGTGAGCTTGCAGCCACCCAGGCCAAGGCAAGAGGAGAGTCTG
 GAAACAGCAGTGAAGACGATTCTGATAGTGAAGATGAATGCCAGTCACTGTGAATCTCTCAGGCAAGGACTCTGGGAAGAG
 CCTCGGGCCAGAGGTACCTCAGCCCCGCCAAGGAGTCACTCCAGAAAGGGGCTCCTGCAGTCAACCCCTGGAAGGCAAGGCCCTG
 30 TGGCAGCCCAAGGCAAGGAAACAGAAAGCCAGAGCAGTGAAGAGTCAAGAGTGAACAGTGGGAGACACCAAGTGTCTGCGACTCTG
 ACCACGAGTCTGCCAAGGTGAACCTTTGGGAAGAGTCCCAAGTCAAGCTGTTTCCACCGTCAACCCGGGGTCACTCGGGAAG
 AGGTGCCAACCTGCCCTGCCCTGGGAAGGTGGGGTCAAGCTCTCAGGCTCAAAATGGTAAAGAAAGAGATGTCTCGGAGAGCA
 GCAGTGCAGAGCTGGACAGTGAAGGCTGGGAGCCCAAGCCAAAGGCTCCTCTGCGCTCCCTCAGAAGGTGAGGCTCTGTG
 GCCACCCAGGTCAAGACTGACAGGGGCAAGGCCACTCAGGAGCAGTGAAGAGTCACTGACAGCGAAGAGGAGGACAGCAGCAGC
 35 AGCTCTGCTGCTCAGGCTAAGCCAGCTCTGGAAGAGCAGATGAAGCTTCTCTAGGAAAGGACAGCCCTGCATCCGCAACAGGAG
 CGAGCACCTGCTCCCATGTAAGGAGGAGCGGTGACTCTTCAAGCAGCCTGTCTATCCAGCTCTGGCCAAAGGCAACCCAGAGG
 TCAGATGTGGACTCTTCCAGTGAAGTCTGAGTCAAGAGGAGTGTCTCCAGCAGCCCCAGGGTACAGGGGAAGTCTGGGGCAAGG
 CCTCAAGGGGAAGTGTGCTTGGGGCAAGGGGTGGCCCCAGTGCACACTCAGAAGACAGGGCCCTCGGTCAAAGCTATGGCTCAGG
 AAGACTCAGAGAGCTCGAGGAGGACTCCAGCAGTGAAGAGAGGATGAGACCCAGCAGCAGGCCACGCCCCCTCGGTCAAAGCTATGGCTCAGG
 40 CAGGCCAAAGCCCAACCTCCCACTAAGACACCTCCAGCGTCTGCATCTGGAAGAGTGTGGTCTCTCAACCAAGGGAAAAACC
 ACCTGTTCCGAACAGCAGCGTCTCTGCAAGGGGCCAGCGGTCTGTGCCAGCCGCGGGAAGAGGAGGCCCCAGCAACCCCAAGCCC
 AGAAGGTTCCGTGGCTGGCACAGGGGAGGACTCAGAGAGCAGCAGTAAAGAGGAGTCTGACAGTGAAGAGAGAGCGCCAGCCAG
 ATAAAGCTGTGGGGAAGACCTCTCAGGTCAAGCTGCTCAGCCCTGCAAGGAGTCTCTTAAAGAGGAGCCATCCAGGAAC
 CCCCAGCAAGAGCGGATCTTCAAGTACCCAGGCCAGCCAGGGAAGACAGAGGACTCAGACAGCAGTGTGAAGAGTCTGACAGTG
 45 ACACAGAGATGCCATCAGCCAGGCGATTAAATCCCTCCAGTTTCTGTCAACCGTAACAGTGTCTCAGTGTCTCCAGCTCCTACC
 CCAGAAGAGTCCAGGCTGTGAACACCAAGAGGCTCAGCAGCCCTCAGCAGACTGCCAGAGCTCTCTCTCAGAGTGAAGAGCGGGA
 CGAGGACTGTGATTCTGCAACACACCTCCACCTATGCTCTCAGAACCAGTGTGACAGCGCCGCGAGCCCTCTCAGGAGCAGCTT
 CCCAACCCAGCAAGAGTGAAGCTGTAGCCGATGCCAAAGGCAAGAAAGCAAAGGCGGGCGGCTCCGCTCAGACAGCAGTGGC
 GTGGAAACACTCCCATGATGCTCCCAAGAGCGCACCTTCCAGCCCAAGGCCACCAACAGCTCGGGAATCCAGCTCCTTGA
 50 GAAGCAGCAGCTTCCCCAGGCTACCCCAAGGCCCCAGGAGCTCGGAGGACAGCAGTGAACCTTCTCCGAGGACAGGAGGATG
 CCAAGAGACCCAGATGCCCAAGTCCGCCCAAGGCTGGATCCAGACCTTCCCAAGAGGAAGTGTGGTAGAGGAGACCCCTACA
 GAATCCAGCGAAGAGTGAAGTGTGAGCTGTAGCCGATGCCAAAGGCAAGAAAGCAAAGGCGGGCGGCTCCGCTCAGACAGCAGTGGC
 GTGGAAACACTCCCATGATGCTCCCAAGAGCGCACCTTCCAGCCCAAGGCCACCAACAGCTCGGGAATCCAGCTCCTTGA
 55 AAGAGCTCAAGAGAGCAGCTCAGCTCGCGGCCCCCAACACAGACACTGCGGAACAGCATCACCCAGCGCTCTCTGGAGCAGGC
 AGGGCATCAAGGAGAGTGGGAAGAAGAGCAGAGCGGAAGTTATCAGGGGACCTAGAAGTGGGGCCCCAAAGAACAAAGAAAG
 AAGGAGCAGCAGTGGCCAGGCAAGCGCTGTTTCCCAAGAAAGGCTCCCATGACTTCAAGGCAAAATCAAAGCTTGACAAAGG
 GAGTGTGTGTGCAAGGGGAAGGGTCTCTGGCCCCCAAGGAGCCAAGGAGAAGCCGACGGCGAGTTGTGGGATAAAGCTTG
 60 AGAGTGGCGAGCAGAGCGACCCGAAGAGCAGTGAAGAAAGAAAGTCCCTCAAGAAAAAAGACAAGGAGAAAAAGGAAAG
 AAGAAAGGAAAAAGTCCCTGGCCAAGACTCTGCTCGCGATCCAGAAGAGAAAAAGAAAGAAAGTCAAGCAGCGCTGCG
 CGTGTGA

HUMAN SEQUENCE - GENOMIC
 CAGGAAAGGTAGACAGGTAGTTCCCTCTGCTCTAACCTGCTGGGGTCTTGTGAGTCACTTCTGTCACTGGGCTGTTTCTCT
 TATCAGCAAGAGGAGTGAAGTCTGCTCTCAAGGACCTTCTAGCTCTGAGAAATAAAACCAAAAAATAAGAAATAT
 GCTGATGAGGCTATGAATTGCTACAACCTTTTGGCAGTTAATTGGGCTTTAGCTATTAATAAACTCATGCATCCCTCTGTG
 CCACTTGCAATTACATCAGAAATTAAGCTTCAAGTCTCAGTCAAGGATGTATTACTAGGATGTTAGAGCACTACTATTATA
 70 GCCAAAAAAGTAGAGGCGAATAACCTGTATCATATCATCTCCATCTCTGTCTGTGTGATGGCCCTACTGAGGAGTGGTTATGAGC
 CCTCTGGCAGCTGGAGCCTGCTTTGAGCCTCAGTTCTCTATCTACAACCTTTGACATGCTTTATAGGATGTTGTGAGGTTTGA
 TTGGTTAGTGTAGAGCCTGGAAGCAGAGTCCAGCTCACTGCACACACTCAACAAATGATAGCTTTACTATTACTCAAAAGAGT
 GTGGCAGATGCCAGCATCTAGAGAAATAGCTCTGCTGTATTGTTAGGTGAAAAAGAGAGTTCAGAGTGTGAGTGTATTAGTAT
 GATTCCCTTTTGAAGAAAGAGCAAGAGAGCCAGGTGAGTGGCTCATGCTGTAAATCCAGCACTTTGAGGGCTGAGGTGGG
 TGGATCATCTGAGGCCAGGAGTTCAAGACAGCTGGCCAACATGGTGAACCCATCTCTACTAAAAATACAAAAATAGCTGGGC
 75 ATGTTGGCACATGCCTGTAGTCCAGCTACTCGGAGGCTGAGGAGGAGAAATCATTTGAACCCAGAGGCGAGAGGTGCAAGTGA

458

GGGATGGGCGGGCACGGTAGCTCAGCCTGTAATCCAGCACTTAGGGAGGCGGAGCTAGCGGATCACCTGAGGTGAGAAGTTC
GAGACCAGCCTGGCCAAACATGGTGAACACCGTTTCTACTAAAAATACAAAATTAGCTGGGCATGTTGGCGCACGCTGTAATCC
TGCTACTCATGTGGCTGAGGCACAAGAAATGCTTGAACCCGGGAGGCAGAGGTGCAATGAGTCAAGATCGTGCCACTGCACTCC
AGCCTGGGCGATAAAGCGAGACTCTGCTCAAAAAAAGAGAGATGGATGGCAGATGGCCTGGTCAAGATAGCTGAGGTGA
5 AATGCTTGTGGTGGGAGGAACTGTGTACACACTGGCCTGGAGAAAGTCCACTCTCTGAGCCAGGAATTTGAGGTACAGTA
TGAGCCATGATCATGCCACTGCACTCCAGCCTGGGCAACAGAGCAAGACACTGTCTCAAAAAAATTTTTTTAAGTCCATAGCA
GGCCAGGTACGGTAGCTCAGCCTGTAATCCAGCACTTTGGGAGGCGGAGGCAGGCGGATCACTTGAGGCGAGGATTCAAAAAC
AGCCTGACCCGACATGGTGAACCCGTCTCTACTAAAAATGCAAAATTAGCCATGCAATGGTGGCATGCACCTGTAGTCCAGTTA
10 CTGGGAGGCTGAGTCAGGAGAATCACTTGAACCCAGGAGGCAGAGGTTGCACCTGAGCTGAGACTGAGCCACTGCACTCCATCTG
GGTGCAAGGCGAGACTCCATCTCAAAAAAAGAGTCCATAGTGGCTGAAGTGTGAAGTACAAGGGCCAGATGGCCCTGGG
GAGATGGGAGGCAGGGCTGGCTGGAGTGGTCTGGTGGGCAGTTGATCTTCTTGGAGAGCAGTGGTAAACCAATGGAGAGTTT
GAACTGGTGAGACAGTATCCTAAGTAGTCAGATCCCTTGGCTGTGGTGTAGGCTCTGCTCCTAATGCTGTCTCAGAACCTCC
TTAGGGACTAAAGGGTATGGGCTTAAGAGCTTATGTATGCTTTCCAGTTTCTCTGAACCTCACTTGTCTTCTTACCGCAG
15 CTATGTACTTACAGATAAGGGGAGCAAGAGATAGTACCATCTTCATTGGAGCAAAATATCCTGCCGTCTGGAGCACAATTC
TAGTAGGAGCAGACAGGTGACAAATAGAAAAAGTTAATAAGTTAATGATATAGTATATCAATGATAGTTGGTGTCTGTATAAA
AGGCAGGCAAGGGGATAAGGGATGTGAGATTCGATTATAAGTAGGGTAGTCAAGGAAGTCTCATTGAGAAGGTGCTATTGGGC
AGAGACTGAAGGAAATGAGGAGTGAAGTGTGAGTGTAAACAGGGGAGAGAACATTCCAGACAAGAAATAGCAAGGCGCGCTTC
GAGGCGAGGTTGGCTGACACATTTGAGGACAGCAAGGAGGACACTTTGCTGAGGTGGAGCAGAGGAAACTGACTCTTGAAATCT
20 TAGTGTACCGGCTCACTGTGGGCACTGACAGATGGTCTTGTTCAAACAGATAGCAGCCTGCAAGGTAGGTATCGCTGTGTCTC
CCATGTTAAGAAGAAATCTGAAGTTCGAAGACGTGACGAGATTAGTTCAGTCCACCGTGCCCCACATTGCTAGCTCATTAGAG
TACTTGATATCTGGCTTATTGACATTTACAGAGACATTGGGCGCTCTGGCCTCTGCTCCAAAGGCTGGATTCCACCTCTGGCTCC
TCTGCTTCCACAGGGGACTGGTACCATTTGGGCCAGTCTTCTCCAGCAGACTAGTAGACTGTGGTCACTGCCACTGGATGCTT
CAGGTGTCTGGGCTGTGATTCTGTCTTTGGGAAGATTGGCTGGCCACGCTTTTGAAAGCTTTTTTAAAGGTCAAAGGTGGGAAAA
25 CCCTGTCTCATGGCTCTAGGCATGGATAGTGCCAGAGAGGCTGGGAGCTGGATGAATGCTAGCTTGGAACTTCCACTCTGGCC
TTTCAAAGGGTGTCTAAAAAGTTTGTAGTTGGGATGGTGTCTTCTGTCTCTGGAAGGTTTGGGACAGAACTGGCAGGGCC
AAGCAGACATCTTCCAGAGCAAAAGACCTCTTTTTTTTTTTTTTTTTTAAAGAAAGGCTTGTCTGTGGCCAGGCT
GGAGTGGGTTGGCACAAGCATGGCTCACTGACGCTCGATATCTGGGCTCAAGTGATCTCTCCACTGAGCTCTGAGTACCGG
GGACCACAGTGCATGCCACATTCTCAGCTAATTTTTAAATTTTTTATAGAGACAGTCTCACTATGTTGCCAGACTGGTCTTG
30 AACTCTGGGCTCAAGTATCTTCTGCTCAGCCTCCAAAGTGTGAGATTACAGTATGAGCCACCATGCCAGCCAAAAAGA
CCCTCTCTGAACACCTGTCTATACAGTCAAGTGTGGGAGATCTGGGCCAAGAAAGGATCTTACTGTCTGGGATTAAT
TGTGGCTTTCTTTACCTCTCTGCAGAAGTGTCTGGCTCAGCCGTAACCTCTTGGACATCTATACACTGGCAACAGTA
AGTGGTGGGCTATAGGGTGGAGTAGGGACGGACACCCCAAGCAACTCAGCTTGGAAATAGCTGGGATACCTATCTGGTCTAAGA
TCTGTCCCATAGCCACTGTGGACACATTGTTGGCTCCAGAAAGCCAGCTCACATCACATGGATGGGATTTCTGTGTGGATAT
35 TGTAGTGGGAGGAGGATGGAGCTGTGATCTTAAAGAACAGAGCTTCTCACCAGCTTGTGAGTGTGCTCAGCAACGTATA
TTGAGCAGCTCTGAAAGCCAGTCTGTTCTTACTTAGTATGCAATATTGTGACAGTGAAGACAGATGGTCTCTTCTCTCT
GCAGCTGACATTGTAGCAAGGAGTAGGCATAGTCAAGAAATGAACAAATGAATGTTAAATTACAGTGTAGTAAGGATTACA
AAGAGAGGAATCTGTTGCCACAGCCACATAAATGGTAAAGTCTGGCTCATCTGGGGTCCAGGGGAAGCTTCCCTGAGGTGATC
40 TTTGACTTGAAGCTATAGGAATGGAGGAGTGAATATGACGTGGGTAGAGAGTGGCAGGTGGAGTGTACCTGCCAGTGGAAAT
GCTAATGCTAAGTCTGTGGCTGGTGGACAGTACAGATGGGCTAGGTATCGCATGGATAGCCATGCATGGCTGGTATCCATG
GTGAGGAATTTGTCTTTATCCAAGAGCAGTGGGCTCGATGGTGGGAGGAAAGTGAAGGAGATTGCTCTGCCACTGGTGGAGCTG
GTGGGCCATGTTCACTCTGCCAGGCAAGAGCTGATGGGCTTGACACAGGAGAAACAGGATAGAAAGTGGATTCCCAAGATC
ATAGGGATGAAACAGGGGCTGTGGATGGTGGGAGAGGAAGTATCTTATTGACTCCACATCTAACTTGTGTACCATGCATAGAG
45 CTGGAAGGAACCTCAGTTTGGAGGGGAAAGATTCAATGACATGTTGAGTGTGAGATGCCCTTTAAACATGTAATTTATGTACT
CTTCAAGGAAGGGGAATCATCAAGGATATATCAACAGAGGAATGGTTGGAATGGAGAGATTAATGTGTTCTCTCATGCAC
TGGCTGACCAAGCTGACTAAGGGAGTGAAGGACATGCAGACATATCCATGAGGAATGGTAGAGTACTGAATTCCTTGGAT
GGAAAGAGGCGAGAGAGGGGTGTGAGGACCACTGCACATCTTTGAGGACCAAGAAATAGTGCCTTCTGAGGCCCGGAGACAG
AAGTGGGCCCCAAATGTACCTGCTTCAGGAAGACAGGTTTCACTTCTGAATATAATGACATCAGAGCTATCTAAAAATGAGGTGG
50 GCTAGGTGAAGTGGTGGGCTCCCTGCTATTAGAGGTGTGTAACAAAGGCAAAATGGTGTGGAAGGGATTACAGCTCTGGTGG
AGAGCTAAGGTCAATGAAACCTGCCAACCTCAGTCTCTGCTGCTAAGGAGAGCTTAGAGCAAGGCGACAGCCACATCTCC
TCACCCTGACTTGGCCAGGTGAGTGGGTGTTATTCTGATGACTTCTTCCCCAAAAAACTGCTTCACTGAGTACTCTGCACACT
CTTCCCTGCCACTGGCCCTTCTATGGGTGAGGGGACAAAGGACCTCAAAACCCAGAAAGGAGCTAGCCTAGCAATTCCTTGCA
GAGTTCAAAACCCAGCACTAGCTGTATGATGACCTTGAAGTGAATTTCTGGCTCCCTGAGTCTGTCTTCACTATAAAATGA
55 ATAATGATGGCAATTATCTATTGCAATTTGAGGGTTAGACACAGTCTCCATATAAAGTGTAAAACTACCGGTTGGAGGCTCCC
CGACTTCTGCACCCGCTCAGTATTTAAGCATCTACTACACCCAGCAATATTCTTGATATAGCTGGGAACAAACAGAGAA
AAATCCCTGCTCAACATTTTGTGGGGGAAAGAGGCAGAAATTAATGATACATGTAATAAATGAAACCTGTTTTAAACAGGAGAA
TCTGCAAGAGTGGCTTCTGGGAAACAGGGACCTACTATCACATCCCAACCATGACAGAGCAGAGTCCATCGCAGCTGGGAAA
60 CCTGGGCTTAGACAGTACTCCCTGGGATGGGGTCAATGGGCGTGAAGCTTCAAAGTCCAGGGCTCAGCCATCTGGGTGCTTA
TCCTACCATGCTCCCTAGACTCACTTTGCCATGAGCAAGTCACTTAGTGTTCAGTTTTGAGACATGTGTGAGGCACTGAGGATAG
TGTAGTGAAGTGGCAGCTGCTTCTCCCTGGGCTTTCTGTGTAGGGAGGAGTCTAGGAAGTAAAGTAAATTAACAGGAGATAGA
GAAAGCTATGAAGAAAATGAACAGGATCACAGGGCAGAGCTGCTTGGAGAGGGGCAATCTTCAGGGGCTCTCTTGGGGGG
65 CTACATTAAGTTGAGACGGGAAGGACGAGGACCTGGGCAGAGTCTTCAAAGAGGCACAGTACACACAGCATGTTCTGAGGGGG
AAGAGCTGGGCGGTTCTGTGAGGTGCTGCAATGGGTGAGTCACTTCACTTAAAGACTGGTAGCTGCTGCACTGTTATATAACA
TTATCCAGCATCTCTGATTATTTAAAGACTAATCAAGAATTGTAAGCACTTTATGAAGTGAAGTGAATGCAAGTACAAAT
TGTGCTATAGTGTGTTTCACTGTTTAGATTCTATGACATGCTTTAAGAGCTGGAAAGGATGCGGGAAGGTCTGTCTAGT
70 CAATTCTGTGAGTGTCTGTGCAAGGAGTGGTATAGACAGTCACTTCTGCTGAGAACCTCAGAGCTTGTGCGAAGCGGA
AGGAGAGGAAAGATGCGGCACTGCAAGCTAAGAAAACCGGTGTGTCAGACCCATCAGCAGCTCGGAGAGCTCGAAGAGGAGGAA
GAGCAGAGGCGGAAACCGCAAGGCAAGGAGCTTGCAGCTTTGGGAACAGGCTATGGAATATTGATTGCTTAGGGTAGAG
TCTACCTCCAGCTTCTCTCTTATCACTAGAAGACCTAAAAGACCTGGGGAGGAGATTGGGAGGCGACACATATCTTTGGCAGT
75 ATTTGAGCCCTTCCCTCGTCCAGGCAATATATCTCAGTCTGCTGGGGTGAAGGCGGAACCAAAACACAGATGGGCTTCC
AGTCTCATTTGTGTATGGGGCCAGGAGTGCCTATTACAGGCTCCAGGTGATTCTTATTAGCTGGAAGAAAGACACAGTTC
AGAAGTACTGCTGGAGGATTTCAAGAGCAGTACGCGACACATTTCTGTGTGACCTGTGGGATGCTTTAGGAATTGCTGATCT
TCATGTTCTGTTAGAAATGTACCCATTAGCACTGGAACGCTGTACTGGGCACTGGTTTTACCCGTTTGCAGGTAACCTGAC
AAGCTTTATAGCCCTTCTCTCTAAGGTCCAGGCTCCTGTACTTTCCCAACAGCAGCCATACTCTACAGAGGAATTGC
TGTGTCTCTTGTGATCGTATTATCTTTTGTCTTACATAGAAGACATTTCTTAATACTTATTTTTTATTTTCAAGACAAAG
TCTTGCCATGTTGTCAGGCTGGTCTTGAACCTCTGAGCTCAAGTGATCCTCTGCTTGGCTTGGCTCTTGGATAGGTGGAATTCATG

460

461

5 GCTGCCAGAGTCTCTATTCTGTTTACATTAGGCTTGCTGTCTCTGTTAAGGATCTCACTCTGGGAATTTCCCTTTTTTTTGTG
TTCTCTCTTCTATTGTTTGAATCCCTGACAGGCCTTTTGGGGTTCTCTGGATATCGGTTAAGGCTAGATTAAAGCTGAAGAAAACC
TTAAACAACAAGTATCTTGTCTGCGTGGCTGCTTGAGCTCCAGCTCTGACCTCAGCATTCCATCTAGCCTGGAGGAGGAAGAGA
CATGTTTCTGACCTTTTATGGCACTCACTTACATCTATGAGCCAGAATTTAATGACATTGCCACCTAGCTGAAAGGGAGCCTGG
10 AAAACATCTGTTTATGGTAGTCTTGTGCTTAGCTAATGCTAAGGAAGGCACGCAATGAGTTTGAGTGTTTATATGTTTCCAGAC
ATCATGTAAACTCTGAATCTCTATTAGTCTTATCATATAACCCGTAGGTGGGCTTATTATTATCTCCATTGATAGAGGACTG
AACTGAGGCCAGTGAGATCAAGTGATGAGCTCAGGTTACACGCCTATTGCATGGAGGAGCCAGAATCCAGACTCGGGCTCCAGC
TCCAGAGTCTGTATTCTTGGCTAGCTGCTTACTCAATCTCACCTTCTCCCTCTTAATTTCCCTTTTCTCACTCAGGTGAAACC
15 TCAGTAAAGAAAACCCAGGCCAAGCCAACCCAGCTGCCGCCAGAGCACCTTCAGCAAAAGGGACAATTTAGCCCTTGGAAAAGT
TGTCAGTGACAGCTGCTCAAGCCAAGCAGAGGTCTCCATCCAAGCAAGTGGGGCCAGAAGCCACAGGAGGTGTGGAGGGTTGGGGT
AGAGAGGAGGACCAGTCACTGAGCCAGCCAGGAGAGGTGCGTGCATGGGCAGGCCACCCACCCAGAGTTGTGCTTGTGCTTGTGCT
GTGGGACCTGAAAGGAATCACTTTTGCTTCAATACTATTATCCCTGCAATTTCAGGTGAAGCCACAGTGAGAAAACCCAGAA
CAGTACCGTCTTGGCGAGGGGCCAGCATCTGTGCCATCTGTGGGGAAGGCCGTGGCTACAGCAGCTCAGGCCAGCAGGCGCAG
AGGAGGACTCAGGGAGCAGTGAGGAGGAGTCAGACAGTGAGGAGGAGCGGAGACGCTGGCTCAGGTGAGGGGAGGGAATGGAGA
20 TCTATCCCTTACATGGGATGTAACACCTTTGCCACATCCAGCTCCTGTCTTCTCACAGTCCACCTCCAGGCTCTCTCTCTCATC
CTGTTTCTCCCTCCAGGTGAAGCCTTCAGGGAAGACCACAGATCAGAGCTGCTTGGCTCCTGCAAGGAGTCCCCAGGAAG
GGGCTGCCCAACACCTCCTGGGAAGACAGGGCTTCGGCTGCCAGGCAAGCAGGATGACTCAGGGAGCAGCAGGAGGAA
TCCAGACAGTGATGGGAGGACCGGCAGCTGTGACCTCTGCCAGGTAAAGCTTGGCAGGCTCTGAGCCACCAACACTCACTCTCT
CAGAACCGGGGTATAGGGCTGGGCTGGGCTGCTCACCTGTAACTCTAGCAGCTTGGGAGGCGGAGGAGATGATCACTTGAGG
25 TCAGGGGTTCAAGACCAGCCTGGCCAACATGGTGAACCCCGTCTCTACTAAAAATATAAAATAGCTGGGCATGGTGGCGGGTG
CTGTAAATCCAGCTACTCGGGAGGCTGAGGCAGGAGAAATCCCTAGAACCTGGGAGGCGGAGGCTGCAGCAAGCCAGATCATGCC
ACTGCACTCCAGCCTGGGTGATGAGAGTGAGACTGTCTCAAAAAAAGAAAAAAGAAAAAGTGAAGAACAGGGTTTA
GGGCGCTAAGGAAAAGAAAGGAAGGCCAGGTTAAGGCTTAAGGCTCCAGCTCCACCATGCGCTCTGCTGTCTCATCCAC
ATCTCCTTAGGTAAACCTGTCTACTAAACCCCAACGAAGACTTCCGTAGCTAAAGTGTCTGGGTCTATATCTAGGTGAGG
30 GTCTCCACAGCTCTATAAGCTAGGCAGTATTTCCACCAAGGCATATGAGACCAAGATCTACATGTTAGTTATTTGTCATACG
TTACGTTTATACAAATGACTCTCCCTGTGAGAGTCCAGGGAAGCTTGGAGTGTGGCAGAGTCCCCCTGAGGTCTGGAGAGAT
GGAGAGGTCTCTACTCTGCACTTGGCCGAGGCTTACATAGGCAGGCGCATCTTCTCAGGAGGCTTGTCTAGCTTGTGCA
AGCCTGGACCTGGAGAGTGGGAGAAAGAAATCTGAACAATTTCCCTGTCTGCTTGCAGAGATAGCAGGGCTTGCTACATCC
TACAGAAGTGTAGGATGACAACTCCAGCACTGCCAAGGCACAGGTGTGTGATGGAATGACTGATGCAGGCTGGCAGGAAATGAT
35 AGATGTCCGCGGGTGGCTCAAGCCTGTAACTCCAGCAGCTTGGGAGGCGCAAGGCGGGCGGATCATGAGGTCAAGGTTG
AGACCAGCTGGGCCAACATGGTGAACCTGTCTCTACTAAAAAATACAAAATAGCCAGGCGTGTGGCAGGCGTCTGTAGTC
CCAGCTACTCGGGAGGCTGAGGCAGGAGATCGCTTGAACCCGGGAAGCAGAGGTTGCAAGTGAAGCAAGATCATGCCATGCTTTG
CACTCCAGTCTGGGCAACAGAGTGAGACTCTGTCAAAAAATAAAAAAGAGATGATAAATGTCCAGGAGAGTGTAGATAGTGG
TAGCAAGTAGGCGAGCCGAGAGCCCTTGCCTTCCAGAGGGGAGTCTTATCAGCTTCCAGCCAGTCACTGCTGTGGAGATGG
40 ACCTTCTGTGTGGCAGGTCTTCCATTCTTAAGGGAGCTGGAAGTCCCTGTGCCAGGCCAAGCTCCATAACCTCTTAGATTGT
TTTCTTATGAGTAAACAAGCACTGAGATGAATGCTCCCTAGCCCTAACCTCTGCTTGTATACACCAACCAAACTACTGGG
GGTGAAAGACATTGGCCCAACCTCTCAAGGAGCTCAGAGTCTGTGGGGCAAGACAGGTGACCGGATTATCCAGACTATGCTAGTGG
TGCTGACAGCTGAAAGAGCAGGTCTCTGAGAGGCCAGAAAAGGAGGAGATGATTGAGCTGAACCTGAAGGATGACAGGCACAAAA
45 GTGGAGAAGGCCCTCAGTGTGTGAGAGGGGCTGGGCATGAAGGCACATGGTCACTGAAGGCAGCTGTCTGCAAGGCCGTAGGCC
CTCCAGGTGCTTGTACTGTTAGTATTATGGAGGACCTAAATGCCAGACTAAGACATAGGCCCGGCCCTTATTTGGGCTGTGTA
GTTTTTTTGTTTTAAAGTTTCAATGAGTCTTAGTCAGAAATGGCCTAATCTGTAGGAGAAAGCCCATTCAAAAGAGCTTAAATA
AGGGGATCAGTGTCTTAAAGTGACAAAAGTCCAGGTTCCAGCTGTGAAAAGCTGGTTCTTTAGCTGAGCGTCAGTGGTAACC
AGATTTCTTACTCTGCACTCCACTAGCTTTATGGCTATAGCAGGCTGCGAGCATCTCTAAAGTGTCTGGGGCAGGCCAGCAC
50 GGTGGCTCACACCTGTAATCCAGCAGCTTTGGGAGGCTGAGACAGGCGGATCACTTGAGGTGAGGATTCAGACCAGCCTGGCCA
ACATGGCGAAACCCCATCTCTACTAAAAATACAAAACTAGCTGGGCTGTGGGCACAGCCTATAATCCAGTTGAGGCAAGAGA
ATCACTTGAACCTGTGGAGGAGGAGTGTGAGCTTGGCAACAGAGTGAGCAGAGCAAGATCCATCTCAAAAAGAGAGATTA
GGGGTAGACTTAAGGCTACTCAGACCTCAGGCTGGACGTTTACCGCCTTAGCCATAGACAAGAGGCCGAGTGTCCCATGACTG
55 GCTGGGAGGAGGCCACCTCCCTGAAGCATGTGGTGGGGCACTGAACAGAGTGAGGGTTCTATTAGCAAGGAACAGATGGGG
GCATGGCTGTAGGAGGAGCCTGCAAGTGTGCTAGTTGCCCCATTAAAAATTTGAAATGACATGTACAATCTTCAGCTT
CTCTTGATAAATTTGAAGCTCAGGCAGCCTGGGCTCTACTTTTGGCTAGGCTGAGTGGGAAAAGGGGGGCCCATTCATAA
GGGACCACTGAGCTGCCATCACCACAGCATTTCCACCAGATCTCTGAGTCTCTCTGACTGCAAGTGTCTCTATCTCTCCAG
60 CCCCCATCATCACCTGCCCAACAGGAGGGGATGGTAGCCAGTGAACACTTCTAGTGGCTCTGCTTTTGTGGGGGTGTT
ACAACCGGAGGTGAGCTGTGCTGGGACCACTGGCTTGTGCTGCAACCTTGTCCAGGCTGCTGTCACTTCTGTGAGACATGG
GCCAACAGCCTGCAAGCCTCAGGTTTATGCTGATCGGAGTCATAAATCCCTTTCATGTTGCGAGTCAGCTCTGGAAGGAGCTAG
CAGGTTGGAAGCATGTTTCCAGTGGCTGTGGGGCAGGTCAGGCCAGCAGGTATCCCTGTGCATGTGCAGGAAGGGGCCAGCTGCC
65 TCCCTGGAAACAGAGTGCTGAGGGTCACTGCTTACTGGCTTGTCCCTCAGCAATGCCCACTCCCCGACCAAGTGTCTTA
TCCAGGTCTGTCCCTCAGAAGGACAGTAACTCCAACCTGCCAGAAGCAAGACCTGGCCCGCAGCACCCAGAGAGGAACAG
GAGGGGTCTCGGAGAGCAGTGAGGAAGAGCTGCCATGACCCAGGTGCGCATGCTTCTCTCTGAGATGCTGAGGATCAGAG
CTGGGCTGGCAGGCTTGCAGGAGAGGCTGAGGCTTGTGCTTACTGGCTTGTCCCTCAGCAATGCCCACTCCCCGACCAAGTGT
70 AGCTCTTCTCTATTGTGACATTCTGAGCCCTGTGAGGCAGGCAGCAGTACACAGTTAAACATACAGGCTTCAGAGCCAGGT
GGTGTGGGGCGAAGCCAGCTCTTCCACCAACAGCCCCATGGTCTGGGCGAGATGCTTTTCCCTCTGTGTAGGCTCAATGTTT
CAGCCATAAATGGGAGACAGTACTGGACCTCTCTCTGCTGTGCACTGGTGCCAGCACACAAGGTACTTGCACAGTCCCT
GCTTAAGAAAGGGTGCCTGTTAACTGTGAGAAGGCGAGGAGTGTGCCCCATTGACAGATTGGGAATCAAGCCTTAGAGTTGAA
GCAGTTTCCCCAATTCTCATGATTCTAAGAGGCTGAGGAAGGTCCAAACGCTGGTCCCTGGCTCCCTGTATCTCTGTGTTT
75 CTGTTTAGGACAGGAGTCTTCTGAATCCATGAGCTTGCCACAGACCTCTCAAGCACCTGTGGCATCTCTGTAGTCTC
CACTGCACCCAGAGCTTAAAGCCAGTCTGCTCAGGCTACACTCCAAAGGTTGGGACAGGCCACCTTATCTTCTGTACTCA
GAGGCCAAGTCAAGCATGTGTGTGCTCAAGCTTCTGTGTGAACCTGGCCCTTCCATCAGACAGCATTACCTTTGTCTCTC
TCTAGCCCCAAGCTCCAGAAGCTTCTGCCAGGCACCTCAGAGCACCAGCTCCCTGTGCCAGGGCTTAACCACAGATCCTGGAGT
TCTGCAACCTCAGACCCAGAGCGGTCTCATGAACCACTCCCTTGAATATCATATACCACATGTTTATCAATTCAGTAAAGT
CAGATGCTGTTTGCACACCTCCAGCAATAGGTTGCTCACTGCTCTCACTTCCATGGCACAGATTACAAAAGTAAAGAACCAACC
80 ACCACCAACATCGGTAACCTCCCTGATTTCTATTCTGTTTAACTCTCCAAACAGCCCTATGAGGGTGGCTCCCTTGTGTT
GCATTTAAGGAACCTGGAGTGAGGCTCAGAGAAGTTGAGGACCTGTCCAGCATCATGGCTGATGACAAAGTGCAGACATG
GTGTTTGAAGCACAGGCCATTCACTTCTGACCCGTTGCTGGTGTGCCCCGACACTCTCTCTCTGGGCTTGGGCATTGCCCTC
TGGCTCTGTGTGAGGCTTTACGAGGCCACTGCTCTCTGAGGATCTAAACAACCTGGGAGGAGGGGACCGCTCCCTTTCTCT
75 TGTGGGGTGGACTAACACAATTAATGAACATCTGCTTAACTGAACCATTTAATGGTATGTTAGTCTGAAGATTCTGGAG

TCTCTATTAAAAAGCAGAAAGAGTACGCGGTTTGTACATTCCCCCAGGAGGATGCGGGGAAGACGGGCATAGCCCGGGGAAGC
TGCAGCCTCTTCTGATTGAGAGATTTTAGTTCCTAATCCCCAGCTCACTAATTATGATTATTTTCATTATTGTACATTTATTGA
GCACCTCTCTATTGACAAGTTTCAGTCTGATTTTATTAGCCCATCAGTGGGGAAAGGGATTGAGGCCAGGGTGTGGGCAGAGTCC
CAGGCTGGGAGGCAGGGATAGATACCTTGGCTCCATTCTAGACCCCTCACTGTGCCTCCGCCCTGTTGTGCAGAGTAGACCTCAG
5 GGCAGAGTCTGTGCTGGGGTCCAGGACAGCTTCCAGATTTTAAACCAAGTAGGTGATACATATGTTAAATAACTTAATTTAGCTATT
CCACAATGTATATGTGTATCAAAACATCATGTTATATACCAAAATATATGCAGTTTCACTTGTGCGTAATATTTTAAAGCCAA
CTTCTTCTATTAGTTTGTCAAAGACGTAGGCCCTGTCTCAAAGTTTGTAGTTGAATCAAAGAAAAGGAAACCTGTAAAGAACTA
AATTCTGTGTGTACATTGAGGCTAGCATAAATTGGTTCTAGAGAGAGCTCCAGTCTGGTGCTGGAGAACTAACTTCTAATCTCG
CTCTGGCACCAGTTTGTGGTTGCCCTGGGTGAGGCCACTTGCCTTCTCTGAGCCTCATTCACTCAATCTCTGGGATGAGACTTC
10 CTGGGTTGGTGGGGTGGACCTTGAGGCTCCAGGCCACATCCCCAGAGAGTAGAATTTCTCAGTCCCCCTGGAGTGGGGCTGGCCCTAG
ATCTGTTAAGCCTCAGGCAATTCTGAGAGAGGTTCTTGGAGTGTGTTGCTTGTGGTTCATGTCCCTTGGCAGGCTCCGCA
GCCTAGGCCATCAGCCCCCTCTCCCCACTCTGTGACTTGTGGAATGAAGGCACAGTTAGAATGAGCTCAGCTTTGACAGGATGGG
GTGAGCACTGTCCAGAAAGCCCTAGGTTTGGTTCTGAGGATCAGACCTACAGGTAGGAGGGGTATCCCGGGTTCCTCTGGG
TCCTTACTGCCAGCACCTATAGGAGGTACAACCAATGTTCCAGCCAGTGTGTTTGTCTGCTTCACTCCCATCAGTTTCTTT
15 TCTAATGACCCAGAACTACATTCTGTGTATCTGTGCTTCCAGTTTCCACAGTGCATTGGAACCCCTCCAGTGAAGGCCAGCC
AGGCTGGGATACTACTAGCCGTTTCAATTAACGGGAACTGAGGATCAGAAAGTTGAGGGGCTTGACCACACAGTGAAGTCATGA
GAGAGGCGTAATGAGAAGCAGGTCTTCTCTATACCTGGGCAAGCTTCACTGCCACCTTTATGAATCTACAGGCTAATGCCCC
GCCCAAGCCCTCCAGCCAAGCCCTGACCACTCCCTCTCTATGGCCAGAGGCCAGTGGGGTGGGCGAGTGGAACT
AACAGGAGGCTTTTGTGCTGAGCTGCTTTTAAACATCCCAAGAGCTATTGTTGCTCAGTGGGTTGTTGCTTCTCTGCTCC
20 CGACAATCTGTTCTGTCTTACATATATATAGATCCCCCTCCCTCAACTGTAAGCCTTCTCCACTTTCCATCTTCTCTTTT
TATATCTGTGGGAAGGAAGCTCTGGAAGTGGCAGATCGGAGCAGCCCGGGGGAGGCTATTGGCAGGGGTAGGAAGGCCATAAGC
CCAGAGAAGCTTCCACCCTCAGGCAGGCACTTTCTGTTTACTTTTACTTTTATGCTCTCCACAGCACCTTAGCACCTGAGGA
GCCAGGTGTGTAAGTCAGGCTCAGGGGTAAACAGGATGGTGAACAGAGACCACTGAGGACTGATTCCACTCTCTTAGCC
TCAGGCACTCCCTCTTCTGCTCCAGCTCTTCACTGGCCAGAGAGGAGCAGAGCTCAAACAGATCTGACATTTGGGGAATG
25 GAAAGTAGACCTGACCAGTCTCTGGCTCACAACCATGTGTGTTCTCGTTAGCTGGAGGTTGAGGAAGAAATGGGCTGGAGATG
CCCTCGTGTGGGTGAACATGTTGAGGATGGTGAGTTCAAACCCAGACTGGCCTGCAGAAATACAGGAGCTGCTGTGCTGTG
TTGCTTTTCTTTTATTGTTTCTTGGAAATTTAAAGCATACCCAAAGATAGATAATGTAAAGAACCCCAAGTACCATCCCA
CCTCAACAGTTAGGAACCTCTGAGCAGGCTCGTTTACGCAAAACCTCCACTCAGTTCCCAAGCCCTGGATTACTTTGACGCC
AGTCTCAGACATGTGAGCTCATCCACAGGATTTCAATATGAGCTCTCAGTTATAAGGACCTTTTAAAGCACAATACGATACAG
30 TGTCAACCTAATAAGTTGATCTACCCAGTCACTGCTTCTTCTTCTGATTGTCTCATAGAGTTCACTTAAAGGCCACGTACGGC
ATTGAGTTATTAACTCTTAAGTCTTAATCTGTTGTTCTCACCACCTCACCACCCCTTGTCTCTGTGCTTTTGTGTTGA
AGAACTGAATTTGATAGCTGGGGAGTTTCTCTGGGCCATGTATCAGGAGGGCTGATCAGAACCTCTGGGGTGGGGCAACT
AGACTGTAATACCTCCCAAGTGAATGCAATTTCAACAGGAGCAGCTTGGAAACTGCTTAGACCACTCCCTGCATTGAGCAA
35 GACTGCTCTGAAGCCAGCCGGGAAAGAGGCAAGATGGACATTGCGCCGTGGCTTGGCTCCAGTGAAGGACAGCAGCTT
GGGTGCTCCCTTCTCTGGGCTTGTGGTTTCCCACTTGTATAAGGGAGCTGATCCTGCTGAATGTAGGGCTTCACTGTGAG
GGTCAGGTGGGCTCTGGGAGTTGTGAAGTGTGCTGGTCTTAGCAGATGTGTGGGTGGGAGGGGGCACCCTGGGCAGCTGGA
ATGGCTCTGTGCTCAGCTGCCCTGAGCTCAGTGGACCTTGTGCTTGTAAACCACTCCCTAACCCCACTCCCTTCCCTGG
CCAAGCCTTAAATCACTGGGGGGTGTGTTGTTTGTGTTTCAAGGTGATTAAACCCCTCTGATTTTGTGCAACCTAATCGTA
40 GTCCAGCTGGGCCAGCTGTACACCCGACAAAGCCAGGCTGCAAGCACCAGGAGGAGGCCCGAGCCTCGGAGAGCACAGCCAGG
AGCTCTCTCCGAGAGCGAGGATGAGGACGTGATCCCGCTACACAGTGTGACTCCTGGTGAGGCGAGCCCTTATGCTAGTGT
GGGAGGGGCTGCCAGCACTGCCACATTGAGGCCAGAGGACAGGACACTGGCTGAGTCACATAGCAAGGTGTTGGTGGGAG
GGGCTTGGGGTCAAGTCTCTGGGCCCTGCAATAGCCATTCTGATTAGGGCTGGCTCAGACCTGCACTTGGGGGAATAGTTGCC
AGAGCTTTTGTGGCAGCCCACTCATGGAGCCAGACAGTGGCTAGAACTGAGGAGGACAGGTTCTCATAGTCTAAGAAA
45 GAATCTGTATCAGTTGACTGCTGTGGAACAAGTGGTCAAGGTGGTGTAGTGAGCTTCCCGTCTTGGTGGCATGTAAAGTAGGTTA
GGCAATCCCTAAGCCAGAGACATCAGGGATAGATTTCATCTATCAGAGAGACAGGACCAATCTGAGGTTTCTTGAATCTCTGAG
AATCTGTGATTCTACCAATGACAACAGGAAAGGTTAATGTTACTATTACAGTTATTGAACAGTTTACAGCAATAAATACCTG
ATCCTGATAGGACAATTTAAATATGAGAGCGGTGACGTGCTCAGCCTATAATCCTAGCTCTTTGGGAGGCTGAGGCGAGCA
50 TCACCTGAGATCAGGAGTTCAAGACAGCCTGGGTAACATGGCGAAACCCGCTCTACTATAAAATACAAAATATAGCCTGGCGG
GCGCCTGTAATCCAGGTACTTGAGAGGTAAGCCAGGAAATCGCTTGAACCCAGGAGGACAGAGTTGCACTGATCTGAGATGTG
CCACAGCACTCCAGCTGGGCGACAGTGAGACTGTCTCAAAAACAGAAAGCAGGCAAAATAGAGATTACTCTGGGCATGGTGG
TTGCACTGTATATCCAGCACTTTAGAAGGCCAAGGTAGGAAGATCGCTGAGCCAGGAGTTCAAGACCAGCCTGGGCAACATA
GTGAGAGCCCTATCTACCTATCTACCTACCTACATACATATACATATACATATACATATATATGTTGTATGTGTGTG
55 TATATTTTATTAATAAAATACAGATTAGCACATAAGAAATATATACCTGTAATTTGCCCCAAATAATGTTTAACTTTG
ACAAATGCTAATTTATAAAACCTAAAATATACGTGTGTTTAAAGCAAGACCACTGTATCTAATGTTCACTAACCTTCACT
GGATATTTATGACATCGGGTTTTTTTCATCTTTACATATTTGAGCAGCAATTCCTAATGGCTACAGAGAAATCCCTGGGTGGAC
ATGCTACAGTGTGTGTAGCCAGCAACCATGTTGGAGGAAGCAGAGGGTTTGTGTTAGGGTGGAGGGGTGAGGGAGTTGGCTGTTAT
60 AAACAGTGTCTTGAAGAATATGATGTAACAGGCTCTGCAGATAACACAGGGGACTCTTAGGAGAGACGATTTAACTGCAAGG
AGAGTCGTTTGTGCGGTGCTCTGGCCATTGCTCAGGATGGCAGCCGACAGTTGGGAGGGGAGGGGATGAGGAAGCCTGGG
GTACCCCCAGCAGCCATTGAGCTCCCTGAGCCTGTCAAATGACATAATGACATCTCTGCTGGGAGGCTGGAGAGGGAA
GTAAACAAGCTTCTACCTCTGTAAGCCCTGAGCAGACTCTAGATCACCAGCAGAGCCGGTAAATGGGTTATTGCCGCTGCTGA
GGAGGCGATGGGGCTTTGTGCCCTGATGTGCCCTCTCTGCTCCATTTCAAGCATCAGAACCAATGTGGTGACCATGCCCACTG
65 CCCACCCAGAAATAGCCCCAAAGCCAGCATGGCTGGGGCCAGCAGCAGCAAGGAGTCCAGTGGATATCAGATGGCAAGAAACAG
GAGGACAGCCACTCAGGTACCTGGTGGCAAGGGAGGGTAATGAGGCCAGTGGGGTGGGGCCCTACTTCCATACTTACCACA
TGTGCTGATGGGATGGCCTGCAATTGCTGTACGCCACACTCCAGAGGTCTGCGCTCACAGCCAGAGGCTTCTGGCCTCTAG
CTACAACCCCCAAATCACCTTTGAGTTATGAGGAAGAGTAATCTGGGACACAGCCTCTGGCCAAAGCCCTGCAGCACTCG
70 AGTCCCTCAGGATTTCCAGCGTAGTGGGGCTTTGATTTTCTTCCAGTTTGAATGCGATGAACAAAAGTTGCCCTTT
TTTGTGTTTGAATAGTGAATCTCAGCATCTTCCAAGCCTTTACCATCTCAGTGCAATTTTATTGTTGCTTGCCTGAATCTAA
AAGCTGGGCTTTTAGGGTTAATGGCTGGTGATTGTTTAGATCATAAACTTAGCACACATCCCCACCCCAAGGGCTCGCATGTG
ACCAAGCTTCAAGAGCCGGAACCCGGGCTCTTCTGAGACCCAGTTTATTGCTCTTTGGGCCATATCAGTCTGTTTCCCTATCCCA
75 CTGAGAGGATGAAGTCCATGACACACTCTGACCTCTCTCTGAGGGGTGGGCTAAGGGGGTGTGGGGGGCGGTGGGGCTGGTGT
GCCACCCACTCCCTGGGCTCATCAAGCTCCAGGTCAAAACTTCTGGGAACATGGGTGTGGATGGGAAGTCAGGCTGTGGTCA
CTGATCTCATGAGCATCGGTTCTGCTGAGGCCCTAGGATCTGAGGAACCAAGCAGGGAAGAAATCCCAAGCTCAGGAGGAGG
GAGTGGTGGGGGAGCGGATTAACAAAGGAACCCACATATAAATAAAAGTATTCAACAGCTGGTAGGAGAGGAACAAATAAAA
CTAGAGAATAGTGGGGTACCTGCTATATGAAGCCCTCTGAGACAGCGATGCTTAAGCAGAAAAAGCAGCCAGTCAAGGATGAG
CTGGGCCACCTCCAGGCAGGGAATGACAGGTCTTCTGGGGGAAGCGCTTGGGAATGAGGGAACCTGAGAGGTGGGGAC

AGCTGGATGAGGAGCTGGGGAGAGAGATGAGCCAGGCCGCTGGCAAGAGCCAGCCACATTGGAAGGCTCTCAGCAAGGGGTCA
 GCCCAATTTCCATGCCCACTCTCCCTGACTGTAGTGGTTATAAAGAGTAGAGATGGGGTCCACCAGGTGGAGATTATCCC
 CAGTGAAGGTGACAGATTGAGTAGTGGGGCCTAAGCTGCTTCCCTGCCCTGGGCTGGGAACCTGTCCCTTGTCTCTGAGAACATGT
 GATTGCTCATACCTGAAGCCTGCCACAGTTTGGCCCTTTGACTGCCCTCAGTCCCTGCTCCAGCCCTCACCCAGCCAGAG
 5 AGCATCTGACCAAGGTGTGGCAGCTGGCATCCCAAGGACTTGTGAGTCTGAGGGCTACCTCTTGCCACACAGGTGTCAAGA
 AGAACCCAGCTTCCCTCCACTGACCCAGGCTGCCCTGAAGGTCTCGCCAGAAAGCCAGTGAGGCTCAGCTCTGTGTGCCAGG
 ACCCAGCCTTCAAGTGGGGTGAAGCTTGGGGAGCCAGGGGAAGCAAGCCACGGAGCGTAGAAGGTGACGGCGTGGCCCTGCATTGC
 GGCACCAAGCTCATCTGCCCCATGACCTCTGCACTTGGTTTGGCTCCCTCGGCCCTCAGTGGCCTAATCTGTGAAGAAGGAATTACA
 GTACCTTTGCTAGTTGAAGGATCAAATGAGGCTGCATGTGTGCCCATCTAACACAGTTCTCTGGCCCTACTGAAGTGTTCAGGAA
 10 GGACCAAGTCTTACTTGGCCCTAATTTTCTCTTCCATTCTCTCTCTTTCACCGAATTAGGTTGACAGTGCTGTGGGAACCTCCCT
 GCAACAAGTCCCCAGAGCACCTCCGTCCAGGCCAAGGGACCAACAGCTCAGAAAACTAAGCTTCTGTAGGTCAGCAGGCCAC
 CAAAGCCCTTGAGAGCTCAGATGACAGTGAGGACAGCAGCAGTCTTTCAGGGAGTGAGGAAGATGGTGAAGGGCCCGAGGGG
 CCAAGTCAGCCACACGCTGGGTGAGGGTGCCAGGGGAAGGCAAGGGTGGGCCAGGAAGAGGGTGTGTGTGGCCTGTGTGGAGCC
 ATAGCTCTGGCCTCAGTCCATATCTCAGACTCACTTCTGCACTGTGGCTGAGCTGGGCCCTCAGTTTCCCCCACTGTACAACATTC
 15 ATGAGGAAGTCAATCCAAATGATTTTCAGAGACCTGACTTGTGTGTGACCCTCTCAGCTTTTGGTATCAGACTCCCTTCACTG
 GCTCCCAAAACTCCAGGGCCATGTTTCTGGAACAGTGGAAGCAGGGAAATAGAAATGGGGCTCAGGAATTAGAAATAGGGCTT
 TGGCATTCAAATGTGCACCTAGCATGCTGTGACTAGCGATAAGTGTGCAAGGAGTGTGAAGCAGTAGGAAGCTTGTGGTAGAGG
 CGGGGAGGGGATGGGGGTGAGGGACCTGCAGAGAGACAGGGCCCTTCTGAAGGGCTCTGCCCTTCCGGCTGGCAGGGGCCACC
 TGGGGCTACCAACAGGATACTGTGCTTCTCAGTAGGTCCACCCCTCCAGGACAGAGACCCTGGTGGAGGAGACCGCAGCAGAG
 20 TCCAGCGAGGATGATGTGGTGGGCCATCCAGGTAAGTGAAGGGAGAGGACTGGCAGCCCATAGGCCCTTAGGGTGGAGCCCCAG
 GCCAGGCTCTGTCTACCCGATCCCTCAGGTGAGGGTCTGGGTCCCTCTCTTCAAGAGGCCCTGGGCAAGGCTCTGTCTGCAA
 GGCACCAAGTGTGGCCAGCCAGCAGACCAAGCAGGCTGCTCCGTCCCTCATAGAGCCCTGAGTAGCTGACCTTGGGGTCT
 GTAGAAGGGATGACCTTGTATCTGGGTGATGTCCGGACAAAAACATTCTTTAGCAGATTATTTAAGGTTACTATCTGTATGTG
 GCAAAAGCTAGTAATTTTCCATTGTATTAATAAGAAATTTCTTTTAAATGTGCTGTCTAGAAAGTGTCTTATTAATTAAGT
 25 TCAGGAGGCACACGCCAAGGGCTGAAGTGTCTGTCTGTGCTTGTGTCCACCCACTCTGCACTGATAGGGCAGGGTGATCCTAGA
 GGGCCAGGGTCTTCTCTCAGCAGGCGATGACTCGGGCTGGGTATGTCAGTGGGGTGGGGTGGTGGCAGCTCTTTCACAACT
 GGGCTTCTCAGTCTCTCTCTCAGGTATATGACCCCTGGAATTAACCCAGCCAAATCCAGGCCCTCAAAAGCCCTCAAAAGCT
 AGACTCCAGCCCTCAGTTTCTCTACTCTGCGCCCAAGATGACCCAGATGGCAAGCAGGAGGCAAGCCCCAACAGGCAGCAG
 GCATGTGTCTCCCTAAAACAGGTAAGTTAAGGTCTCAGGAGGGACATAGCAGGACACAGAGGGACAGGGCAGTGGGCCCTTCTT
 30 GCCCTCTGTAGCAACAGTCTCCCAACATGGTCTGTCTGCTGCCCTCAGGCTTCCCAAGTGAGACCTTCCCAAGTGAGACCTTGTGCTTGGAC
 CTGAAGATGCTCATCAAAGTGACGTTGGGGCCAGGTGCACTGCTCATGCCATAATCCAGCCTTTGGGAGGCCGAGGTGGGCA
 GATTGTCTCAAGCCAGGAGTCAAGGCCAGCCTGGGCAACACAGAGAGACCCCATCTCTAAATTTATTTAATTAGCCGGTGTGA
 TGGTGACCGCTTGTAGTCCCAATTACTTGAGAGGCCAAGGCAGAAGATGACTTGAAGCCAGGAGTTGAGGCTATAGTGAGCCAT
 35 TGCTGCTCAAGCCAGGAGTCAAGGCCAGCCTGGGCAACACAGAGAGACCCCATCTCTAAATTTATTTAATTAGCCGGTGTGA
 GATCGTGCCACTACACTCCAGCCAGGGTGGTACAGTGAGACCTGTCTCAAAAAAAGTACAGGTGGGGCCACGCCAGGTGTC
 TGGCTCCCATGGCCCTGGACAGCCTGGAAGTGGGGTGTATCCAGCCCTGGGTGGTGTGATGACCTGGTAGGATAGCCCTTGGC
 TCAAGGAGAGCTGCGTCTTTTGGCTTGTGGAGCAAGTGTGGCTCTCTCAACCATCACCATCACTTTTCTTCCCTGTAAATAGG
 CTCACGGTGTGGGCCCTTGGGCCCTCAGAGGATAGCTTAGACAATAGGCTGACAGTCACTTTGGAGGACACTCAGCAGCTCAGGAG
 40 ACCCCAGGCAGTAGACTGGCCCCAGGCTGTTCTGACTCATTTGTAAAGCCTTGGAAATCCCTTGGCCACTCTGGACCTCTGTGTCTT
 AACTCATCAAAACAGCAGTTGATGTATCCAGTCTGTGTCAAGGCATGGCACATGTAGAAATAGTCACTTGTATTTGGAGGGCAG
 45 CTGAGGATTTCAATTCACTTAACCTGGGGCATCCACACTCTCTGACCCCTACTGGAGCTAAGGGTCAAAATATGTACCACTGGGCA
 CACTTGGGACAGCTCCAGGGCTTCCCGAGCTTGGTGTCTGGGTGTTGTCAGATAAGCAGCAGAAAGTGGGCCCTGGCGCAGTGG
 CTGCTGCTATAATCCAGCCTTTGGGAGGCCAGGGCAGTGGCTCACTTGGGTGAGGAGTTCAAGACCAGCTTGGCCAAACATG
 GTGAAACCTTGTCTCTACTAAAAATACAAAAACTAGCCAGCAGTATGGCAGGCGCTGTACTCCAGCAACTCAGGAGCTGAGG
 50 CAGAGAAATCGCTTGAACCTGGGAGGTAGAGTTGCACTGAGCCGAGATTGCACCACCGCACTCCAGCCTGGGCAACAGAGCAAAA
 CTCTGTCTCAAAAAAAG
 CTCTGCTTAACTGGCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCTGCCCT
 55 GGGGCTGAGGGGCCAAGCTCACTGCTGCTGCAAGGGGCGAGCCCTAGCCTCAGTGTGACATGAGTACCACATAGAGTGTGACATGG
 AGTATCCACCTGGGCCCTTCTCCAGGCAACACCTCCAGGACCAACACCAAGCCACCTTTCAGAGCCAGCATGCGAGGATGTT
 GTGCCCTGAGACCCAGAAATGGGGCAGAGACCTCCAGTCACTTGGAAAGTTAGAGCCGTTGAGGAGACCCAGTATGGGGCTTTCA
 GCTGCAGCTTGGCCAGGCTGGGTGCGAAGAGGAATGTGCTCACTTCTTCCCAACATTCTCTGTGAGAGGGCGGTGCGACAG
 GAGACATTTTAGAGGGGGCTGTGAAGGTTTTTTTTTTTTTACACGTGTAGTCAGCACAAATTATCAAAGGCCAAGCAGAGCGGTG
 60 GAAAATTTCTAAACAAAGGCTGACCCAGAGTCTCTCTGCGAGGAGTAAACCTGCTTAGTCAGCCACCAAGCTGTATATACGCTGCA
 CCCAGAGCTCCCACTTGGCTGGACCCCTGACCAAGAGGGCGAGTGTGGGTAAATCATCAGTTGAATGTCTGCATGGCCCCCA
 CTTTATATATAATCTACAATGTATCATAGGAAGCCTTACTGTTTATCCACCCCTCAGTTATAGACAGGGAACCAAGGCCCTGG
 GAGGAGTGGGTCTGGGCCAGAAATCACTGAAAGTGGGTGGGAAAGTCAGACCTAGAACCAGGCTCTCTCTCTCCAGCTCCAG
 65 ACTCCATCTCCCTCTTCTGAATTTTCACTTCCATTGATAGATTTTCAAGCCCTTTCATTAACATTCTGGAGTCATTTCTGTCCCC
 CACCTTAACCTGAGTTTTATGATAAGAGACAGGGAAGAGCTGTAAGTTAGAAATGAAGTCAAGGTGTGAATTTGGTGAAGGT
 GTGAGCTTAGGAGACCAAGCTGGGGCAGAGTGACCGCAAGCCTTGTCTCTCCCATCTGTGCCATTGTGAAGAAAGATGGAGTCACT
 CCTGCAACCTCTTCTGCTTCTAGGTACCATAGATCTGTCCCCCACTCTCCAGATCTGTGACCCACATTCTCTCTCCATAGGT
 70 GGAAGAGAGGCTGCTTCAAGCACCACCTCAGAAAGTCCCGGAAGCCCAAGAAAGGGGCTGGGAACCCCAAGCCTCAACCTGGC
 GCTGCAAGCAACATCACCAGTGCCCTCTGGGCCAACCTGGGCCCTGAATGAGGCCAGGTGCAAGCCTCAGTGGTGAAGTCC
 TGACTGAGCTGTGGAACAGGAAGAAAGAGAGGTGGTGGACACCACCAAGGAGAGCAGCAGGAAGGGCTGGGAGAGCCGCAAGCGG
 AAGCTATCGGAGACCAAGCAGCTGCGAGGACCCCAAGGAGCAAGAAAGAAAGAGTGGGGGCGGGGAAGGTGGGGAGGCCTC
 75 TGGTTCCCCAGAAAGACCTCCACGACTTCAAGGGGAAAGCAAGAGAGACAAAGCAAGTGGTGTGTCAGGAGAAAGAAAGGA
 AGGGGCTCTTGGCTCCCAAGGGGCCAAGGACGAGCCAGGAAGAGGAGCTTCAAGAGGGGATGGGGACGGTTGAAGGTGGAGATCAA
 AGCAACCCAAAGAGCAAGAGGAGAAAGAAATCCGACAAAGAGTGAAGTGAAGCGCTTCTCCAGCCACCCCAAGGGCTGTGGGC
 ACCCCAGGGGGCGGGAGGACCTCAGCCAGCAGCTGGTCTCATTCTCCATGTAGAAAAGAGAGGCTGAGACAGCCTGGCCA
 ACATGGCAAAAAACCCGTCTCTACTAAAAATACAAAAATTAGCTGGAATGTGGTGGCGGCACCTGTAACTCAGCTACAGGAGG
 70 CTGAGGCAGGAGAAATGTTTGAACCCGGGAGGAGAGCTTGCAGTGAGCCGAGATCACGCATTGCCTCAGCTCAGCTACAGGAGG
 CAAGACTGTCAAAAAAAG
 AACTCGATTCCAGAGCACTTGAAGTCAAGCTGCGGAATGTCTCAGAAAGTGTCTCAGAAAGCAGGAGTCAATGCTCTTCCCAAGCCAGG
 CAGCAGATCTTGGAGGAACCTGCTTCTCAGCCAGCTCCTGGGTGCGAATGGACCAGGAACAGAGCTGTGAGAACTCTCATCCCA
 75 AACCCCATCTGTCTCTAGACCTCAGTTTTTCCCTCCATAGTAACACTGGCCCTTACTGAGTGTGTCTAGACTCCGATGACAGC
 AGGACCTCATTTAGGTAGAAATGAGACTCAGCAGGTAGAAAACTCGGCTCGGGCTCGGAGAAAGTAGAGATGCTGTTTCAGGGCCAC

AGAGTTTGTAGGTGGAGCCAGAGTCAAACTTAGGCAGCACTCTCGAGCATCGCCCTGGACGGTGGGTGGCAGTGACGCCGAA
GAGCCAGCTCGTTCTGGAAACAAAGTCGGGCACCTCAGAGCAGGACTTGCAGCCCTTGGTGCTCAGAACTGTGCTAGATTTC
TTTACAGTAGGGATAGATAGTGTCCATTAAATAAATTTGGGGAGTTTAAAGTGTAGTTAGCTAAAGAAAAATGGTAGTCA
TCCAGGTGGTCCATGGATGGGACAGAAATCATGAGCTGGCTCCAGGGGGCAGGTGAAGTGGCCCTGCTGGGTGATCACCACAGCT
5 GCCAGCCTGTTTATTTTATTTTATTTTGGAGACAGGGTCTTGCTCTGTGCACCCAGGTGGAGTTTCAAGTGCAGGAACGAGCTCACTG
CAGGCTCAGCCTCCAAAGCTCAAGCGATCCTCTTGCTTCAGCCCCCAAATAGCTGGGACCAAGGCGTGACCAACATCCCCAGC
TAATTTTGTATTTTGTAGAGACAGGTCTCACTATGTTGCCAAGCTGGTCTTGAACCTCTGGGCTTAAGCAATCCACCCGCT
CAGCCTCCCAAAGTGTGGGATTGCAGGAATGAACCTCCACGCCCGCCCTGCTGGCTGTGTGATGGCTTCTGGTGGTGGGG
10 AAAGCTGGGAGCCCTGCCCTGTGCACCTCCCAACATTGACCCAGCACTTAGGATTACCATCTGTGTGTTGAGAACTTTACTTTAC
TTCCCTTAGGAAAAAAGACAAAGAAAAAAGAAAAAGAAAGAAAGCAAAAGGCCCTCAACCAAGATTCTGAGTCACCGTCC
CAGAAGAAAAAGAAAAAGGTAGAGAGTTCTGGGGTGTCTCAGGCCAGAAAAACAGACCCAAACCCAGGCTCTCACACAC
CCAGACCTGGTTCTGCCCCCTTCCATTTCGGGGCCAGTCGGGGGCGTCAGGGTGTGACACACCAGGAAGAGGCTGGCAG
GGCATGTTCCCTGAGCACATGGAAGCCGTAGAAGTGGCCTGCCGAGGTAGAAGGGTGTGGGGAAGGAAGAGAGACTCCCCCA
GCACAGGGAACACAGGTAGACTGTGGCAGGTTCCAGGTGAAGGAAACGTTGCTGGGCTGCGTGTGCCAGCTGGCAGGCTCA
15 CCTGAAACACAGCTGCTCCTCAGGCCCGGGGCTTAGCAGCTCAGACACAGATGAAGTTCTCACCTTGGCCAGCAGGCGCTCAGC
TGATTTAGGAGAGCTGAACATCTGTTGCTCTGCCCCCTGGAGGTGCTGACAGCCAGTATCTATTCTAGGGGAATTCACAGT
CCTCAGGAGGTGGGGCAGCAGTGGGTGGGAAAGCTGCAGGTCTGAGAGCCTCTCGTACTTCCCTCTCAGAGAAGACAGCAG
AGAGCAGAGTGATGACGAGCACCAGCACCAGGACAGGTAGCTTCCCAATCATTCTGAGCATTGAGGTGGGAGGACAGCTCT
20 GGTGTCCCTGTGGTCCAGAGAGCCAGGACAGCTGATAGGTGGGCTCTAAGGGGAAGGAGGCTGGGGAAGAGGTTCTGTTGC
CAAGGGTCCATGGGGCAGTGGGGTGACATCAGGAGTGGCAGTGCAGCATCAGAAGGATCCAGAACAGTAATGGCAGTGGTGACA
CCGAGTGCCTGGGTGACAGGGTGTGTCATGCTTAGGGGGTGTGCCCTGGGATGGAGCCTGTTGTGATGGAGTCCGATACAG
CTTGGTCTCCTCTCACTGTGAGCGGTTCAATTTCTCATGATCTGTAACTTGGGGGCAATTCCTTTTGGGAAGGAAGATGGT
CTCTCAAGATGAGCTATCACCATGGATCTATGCTTCCCTATGGAGGACAGGCGCTGCCAAGTGGTGGTACAGTTAGCTGTCTCCAC
25 TGGCTCTGCTGGCCCTGTGGTCAACCAGCTCCTGTAAATAGGTGTGATGACAGGCCGCTCCTGGGCGAGGCTGAGGCTTAT
GTGAAGCTAACTAAACACTAAAGGACTCAGCCAGTTCTCAGAACATTCCAAGTGTAAAAATGTCCACTGTGGTTAATGCCTC
CCCCCTGCATTGGAGATGCCAGATTTCATTTTCTTGCAGGGGAAAGGGTCAGGAAATTGACATCTGCATGTGTTTCTTCCCC
TAGGGAATTCCTAGCCGAGCAGTGGCCATGCCATGCTCTGACCTCCACCGACCTCTGCCCACTAGGTTGGAATTAACGTT
ACCTTCCCTCGCTCCACAGAGAAGACAGCCAGCTTCAGGGTCTCTGTGCTGGCCAAAGCCAGTGGAGCTGGGGGAGGCTGGTCC
AAGGAGAAAGTGGACAGCTCCCATGACCTCAACCCACTCCCCCAACACAGGACGCTTATATAGATGTGTACAGTATATGTATT
30 TTTAAGTGACCTCCTCTCTTCCACAGACCCACATGCCCAAGGCTCGGGACTTCCACCACTTGTCTCCACAGTCAAGTAA
CCCTGACCTGTGCTCATCCCTGCGCTCGGTCTCTGGCTGATCCGAGGCTTTGTCTTCTCTCTCAGTCTTTTGGTTGTG
TTTTTGTGTTTTTTTAAATAACTCAAAAAAATAAAGACTTGGAGGAAGGGTCAAGCTCCAGTGCATCTGGGGCAGATGT
TTCTTGAAGGAGTGTCTCGCCGACCTCGGGATTCCTCTTGCCTGCATGTTGAGGCTATGGGTGACCGTGTAGTGGGACAG
35 GCAGTGAGCAGTGAAGTGCCTGAGTGCCGAATTTGGTGGGAAGGCTTCTGGATGAGGTGGCATCTAAACTAAAGGATGGAACTAA
AGGATGCTCATGGTTGATTTCTGTGTCAGAGTAAGTCTGTAAATACCCAAAGACAAGAAATGGAAGGGGCTGAGAACTCTCGA
GTAGGCTCGAGCTAGGGGAGGCTCCTCGAGGTGCTGTTGAACAGCTGTGGCAGGACAGCAGGTCTAGGAAATCGGAAGT
GAGTTGCCCTCAAAATCGAGCTCACCATGCTTCTGTGGTGGTGGGCAAGAGTGGATGAACATGAAGACAGGATGATGTCTTG
GGTGTGAGTGGAGGAGGGAGGGATAGCAAGGAGGTGCTGCTGCTCCAGCTGGAATGACAGAGCCCACTTCCCTGGGGCC
AGAGCAGTGTGAACACAGGGGCTCTGAGATGCTCCAGAGCTTTAGCCTCATGCTGGAACAGCCAGAGGAGTGCAGAAA
40 AGGAATGACCTGTGGAGTGTGGAGGTCGAGAGCCAGGTTGGCATCCAGCTGCAACCTTGACTCGGGGCCCGGGCCAGCCCTC
TCTGGCTCTCTCTCTCAAGCATGTTGCTCTAGAACAGAACTACAGAGTGTGCTCTATTGGGCTTGTGACCCACAGCAAGA
CTTTAAACTTAAAAATGGGGTGAATTTCACTGAGTTCTTGATTTCTGGCTCCTCTTAAAAAGATAAATCTGGCAACGGGGGCTGT
GCTTCTCTGGCCAGATCCTGTGCTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
45 ACTTCTGTCCATCTGACACGGAGGCCCTATGTGGTGGCATCTGTCTACATTCACACTGTTCTTAGTATAGAAATGAAAT
GGGACATAGGAAATGAAAGCTGTACCAAGAGAGCTGTGCTTAACTAGGCAAGAGCCTATTCTTTTGGAGTGTAGATGTT
CGTGTGTGTTAAACATGTAATCAAGTATGTCTGTGTCCTGCTTCAAGACTACAGCCCGGGCCAGGCTGCGCTGGCCATCTC
TGTTGGTTACTTGGGCTGCGTTCTCCCACTCAGTACTGAGTATTAAGCTCTTTAGTTACCTCTTTAGGATAAATGAATGATCT
CAACAGAGAGCCAGGAGCCAGAGTGTCTAATTACTACCTTTTATCTAATGTGAACCATGGCCCTGAAAGCTGATAACAAGCTT
GGCTGAGCAGAGGGAAGTAGGGGTCGGCAGAAAGGATATGGGTGGAAACATTGGCTCTTCTTGGGAGTGTGCTGGGGAAG
50 GGAAGAGAGTGGCTCAGCCTGCAGGTAAATAGGCTAGAAAGCAAGGCCAAAGGCTGGAGGGGAGAGGACAGTCAAGTCTCCAG
CCTGGGCTGCGGTTAGGGTTATCCCTCTCCTGTGCTTCCATCTCGTCCATGAGCCTAGGTCTTGGAGCCTTGTGTTGGAG
GCTGCTGTGATGTGAGAACGGGATCTGTCTAGCTTTTGGCCACTTCTGGGACCTCAGCCCTCTGTGACAGATGGAGATGGG
CAGCAGGGCCTTCTGCT
55 CATGGGATGAGGTACAGGTGGGAGATGGGGAGGGGCTGGGGGCTGAAGGAGCAAGAAAGCTGTAGCTGTGTGGGGCTGGCAGG
ATGTTGAAGACCGCTCTGCTGCTCTCATGAGGAGTGGAGAGAGAGCAGCAGGTGAGGTGGGGTCAACCATTTGTTGTCCC
TGCCCCCTTCTAACATCCTGGACCTGACAGCAGTTAAGGACTGTCCACCTCCCTGCCCCCTGCTCAGGTCCAATAATGACCAT
CATGATTTGTGTAACCTCCACAGCCCCCAACCTGTTCTTCTGCTGTGAAATGGACATCCAGGAATGTTGGAGAGTGGCCC
AGCCTGCACCTCTTCACTGCCCAAGAGGAGTGGCCCTGCTGGGGATGAGTGTGTTGACAGATGGCCCTCTGCAAGGCC
70 TTACCTGGGCCAGATCCTGCTTGGTCAACCCAGCAAGAGCGGTCCTCCAGTTCCAGTGACTCTGCAAGGAGCAGCAAGT
CCGTTTGTCACTTGAAGTGACGCTACCTGACCCAAAGATGCTGAGGGCAGTGTCTCCACCTAGCCACAGGCTTAGTGCCTGGGA
AAGCAGGTACCCAGGGAAGGACAGCTGCAGCAGCAACAAAGAGGTGTAATGGGGGCTGAGTGAGAAGGGGTGATGAAATGAGA
TGAGTGTGCTGAGGAGTGAAGAGGAGAGATGATAAATGGACAAATAGGAATGCACAGGTGGGTGGATGGATAAAGGGCTGGACGCA
TGACTACGTCACTGCCCCAGGAGCTGCCATCCTGGGTGTCTGGTCCCATGTGCTTCAAGGGGACCTCTTGGCCCTCAACCTTC
65 CTAGTCTCTCTGCTCTGACACTGGCAGTGGCACTGCTTACCCTGCACTTATGTTGCTGGGCTCTGTTGCTGGGCTCTGTTGCTGGG
CTCGTGGCGGTTGGGAAGACACACAGCAGTAGCCGATGCTCCATAGCACTGGAGTGGCAGATAGTTGGCTTCTGCTGGCACT
TGGGCTGAAATGAACCCGGGTGGACAGCAGGATGTGGTGACCTCTTCTGGCACTTGGTCAGTACTGAAGCGACAGGCGATGATG
AGGACACAGTGAAGTGAAGTCTGAACCCAGGCTGAGCAGAGCTAAAGACCCACACCACTGCTGTGGGCTTAATGCCTTCT
TCCCAAGTCTTCTTACTCACTCCAGCCATCACAGGATGGGAAACTGAGGCTAGACCAACAAGGTCTGAGATCAAAAGGAAGT
70 GAATGGCCATGTGCTCAATTCACCTCAGAAGTTGATGGTTCTTCTGACACTCAAGCCCATACAGTTTGGGCCAGGCAAGTG
GCTCATGCTGTAACTTAGCACTTGGGAGGCGAGGTGGGCGGATCACTTGAAGTCAAGAGTTCAAGACCGCTGGCCAACT
GGTGAACCCCTGTCTACTAAAAATACAAAAATAGCTGGGGCTGGTGACATGCTTAAATCCAGCTCTCGGAGGCGCGAG
GCAGGAGAATGCTTGAACCCGGGAGGCTGAGTTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
75 ACTTATCTCAAAACAAACAAATCAAAACAAAAAACCAATTACAGTTTGAATGCACTTGGGATCTGATTTCTAGAGAAAAGCA
ATGGGCACCTTGGTAAGTCTAAGCTTCTGTTACTGGGAGTCTCAAGTAGAAATGGGGTTACCGTTTGTGGAGATGCTCTAGA

75 HUMAN SEQUENCE - mRNA

5 TAAGGGCGCGAGGGAAGTGGCGGGCGGGGACTAAGGCGGGGCGTGCAGGTAGCCGGCCGGCCGGGGTTCGCGGGTATGGCCGAGGC
 CAGGAAGCGGCGGGAGCTACTTCCCCTGATCTACCACCATCTGCTGCGGGCTGGCTATGTGCGTGGCGCGGGGAAGTGAAGGAGC
 AGAGCGGCCAGAAAGTGTTCCTGGCTCAGCCCGTAACCTTCTGGACATCTATACACACTGGCAACAAACCTCAGAGCTTGGTCGG
 AAGCGGAAGGCAGAGGAAGTTCGGGCACTGCAAGCTAAGAAAAACCGTGTGTGAGACCCCATCAGCACCTCGGAGAGCTCGGAAGA
 GGAGGAAGAAAGCAGAAAGCCGAAACGCCAAGCCACCCCAAGACTAGCATCTACCAACTCTCAGTCTGGGGGGGACTTGCCT
 CAAGCATGAAAGAAAAAGCCAAGGCAGAGACAGAGAAAGCTGGCAAGACTGGGAATTCATGCCACACCTGCCACTGGGAAGACG
 GTGGCCAACTTCTTCTGGGAAGTCTCCAGGAAGTCTCAGCAGAGCCCTCAGCAAACTACTACGTTGGTCTCAGAACTGAGGAGGA
 GGCAGCGCTCCCGCCTTGGAGCTGCTGCCAAGCTGGGATGGTGTGAGCGGGCCAGGCCGACAGCTCCAGCGAGGACACCTCCA
 10 GCTCCAGTGATGAGACAGACGTGGAGGTAAAGGCTCTGAAAAAATTTCTCCAGGTGAGAGCTGCTCAGCCCTGCCAAGGGGACC
 CCTGGGAAAGGGGCTACCCAGCACCCCTGGGAAGGCAGGGGCTGTAGCTCCAGACCAAGGCAGGGAAGCCAGAGGAGGACTC
 AGAGAGCAGCAGCGAGGAGTCTATCTGACAGTGAGGAGGAGACGCCAGCTGCCAAGGCCCTGCTTCAGGCGAAGGCTCAGGAAGAA
 CCTCTCAGGTGAGAGCTGCTCAGCCCTGCCAAGGAGTCCCCCAGGAAGGAGTCCCCCAGCGCCCCCTGGGAAGACAGGGCCT
 GCAGTTGCCAAGGCCAGGCGGGGAAGCGGGAGGAGTCTCAGAGCAGCAGCAGGAGAACTCGGACAGTGAGGAGGAGGCGCTGC
 15 TCAGGCGAAGCCTTCAGGGAAGGCCCCCCAGGTGAGAGCGCCTCGGCCCTGCCAAGGAGTCCCCCAGGAAGGGGCTGCCCCAG
 CACTCTCAGGTGAGAGCTGCTCAGCCCTGCCAAGGAGTCCCCCAGGAAGGAGTCCCCCAGGAGGAGTCAAGAAGCAGCAGCGAGGAGTCA
 GACAGTGACAGAGAAGCACTGGCAGCCATGAATGACGTCTCAGGTGAAGCCTTGGGGAAGGCCCCAGGTGAAACCTGCTCTAC
 CATGGGCTGGGGCCCTTGGGGAAGGCGCGGCCAGTGCCACCTGGGAAGGTGGGGCTGCAACCCCTCAGCCAGGTGGGGGA
 AGTGGGAGGAGGACTCAGAGAGCAGTAGTGAGGAGTCTCAGACAGCAGTGTGAGAGAGGTGCCCAGAGCTGGGCCCGGCTCAG
 20 GAAAAGTCTTGGGGAACATCTCCAGGCCAAACCCACTCCAGTCTGCCAAGGGGCCCTCAGAAAGCAGGGCCTGTAGCCGT
 CCAGGTCAAGGCTGAAAGCCCATGGCAAACTCGGAGAGCAGCGAGGAGTGTGTCGACAGTGCGGACAGTGAGGAGGCACCCAGCAG
 CCATGATGTCAGCTCAGGCAAAACAGCTCTGAAATTTCTCAGACCAAGGCCCTGCCAAGAAACCAATACCACTGCATCTGCC
 AAGGTGCGCCCTGTGCGAGTGGGCACCAACCCCGGAAAGCAGGAAGTGGCACTTCTCCAGCAGGTCTATCCCCAGCTGTGGC
 TGGGGCAGCCAGAGACAGCAGAGGATTTCTCAAGCAGTGAGGAATCAGATAGTGAGGAAGAGAAGCAGGTCTTGCAGTAACCC
 25 TCAGTACTCCTGGGAAGACGGGGCTACAGTCAACCCAGGTGAAAGCTGAAAGCAGGAAGACTCTGAGAGCAGTGAGGAGGAATC
 AGACAGTGAGGAAGCAGCTGCATCTCCAGCAGAGTGAAACCTCAGTAAAGAAACCCAGGCCAAAGCCAAACAGCTGCGGCCA
 GTGACCTTCCAGCAAAAGGGAACAATTTAGCCCTTGGAAAGTTGTCACTGACGTGTCTCAAGCCAGCAGAGTCTCATCCAAG
 GTGAAGCCACCCAGTGAGAAACCCCAAGACAGTACCGTCTTGGCGAGGGGCCAGCATCTGTGCCATCTGTGGGAAGGCCGTGGC
 TACAGCAGCTCAGGCCAGACAGGGCCAGAGGAGGACTCAGGAGCAGTGAGGAGGAGTCAAGCAGTGAGGAGGAGGCGGAGACGC
 30 TGCTCAGGCGAAGCCTTCAGGGAAGACCCAGATCAGAGCTGCTTGGCTCCTGCCAAGGAGTCCCCCAGGAAGGGGCTGCC
 CCAACACTCTCTGGGAAGACAGGGCCTTCGGCTGCCAGGCAAGCAGGATGACTCAGGAGCAGCAGCGAGGAATCAGACAG
 TGATGGGAGGCACCGCAGCTGTGACCTCTGCCAGGTGATTAAACCCCTGATTTTGTGACCTAATCTGATGTCAGCTG
 GCGCAGCTGCTACACCCGACAAAGCCAGGCTGCAAGCACCCCGAGGAAGGCCCGAGCCTCGGAGAGCAGCAGGAGCTCTCTCC
 35 TCCGAGTGAGGATGAGGACGTGATCCCGCTACACAATGCTTGATCTCTGGCATCAGAAACCAATGTGGTGACCTCCCACTGC
 CCACCAAGAATAGCCCCAAAGCCAGCATGGCTGGGGCCAGCAGCAGCAGGAGTCCAGTCCGATATCAGATGGCAAGAAACAGG
 AGGGACACGAGCCTCAGGTGTCAAAGAAGAACCCAGCTTCCCTCCCACTGACCAGGCTGCCCTGAAGTCTCTGCCAGAAAGCC
 AGTGAGGCTCAGCTCCTGTGTCAGGACCCAGCCTTCAAGTGGGGTTGACAGTGCTGTGGGAACACTCCCTGCAACAAGTCCCA
 GAGCACCTCCGTCCAGGCCAAAGGGAACCAAGCTCAGAAAACCTAAGCTTCTGAGGTCCAGCAGGCCACCAAGGCCCTGAGA
 40 GCTCAGATGACAGTGAGGACAGCAGCAGTCTTTCAGGAGTGAGGAAGATGGTGAAGGGCCCCAGGGGGCCAGTCAAGCCAC
 ACCTGCGGTCCACCCCTCCAGGACAGAGACCTGGTGAGGAGACCCGACAGTGGCAAGCAGGAGGCAAGGCCCAACAGGCAGCAGGATGTTG
 CCAGTCTCTCCTCTCAGGTTATATGACCCCTGGACTAACCCAGCCAAATCCAGGCCCTCAAAGCCACTCCCAAGCTAGATTCCA
 GCCCTCAGTTTCTCTACTCTGGCGCCAAAGATGACCCAGATGGCAAGCAGGAGGCAAGGCCCAACAGGCAGCAGGATGTTG
 45 TCCCTTAAACAGGTGGAAGAGAGGCTGCTTCAGGCACCACTCAGAACTCCGGAAGCCCAAGAAAGGGGCTGGGAACCCCA
 AGCTCAACCTTGGCGCTGCAAGCAACATCACCCTAGTGTCTCTGGGCCAACCTTGGGCCCTGAATGAGGCCAGGTGACGGCCT
 CAGTGTGTGAAGTCTGACTGAGCTGCTGGAACAGGAAGAAAGAGGTGGTGACACCACCAAGGAGAGCAGCAGGAAGGGCTGG
 AGGTGGGGAGGCTCTGTTTCCCAAGAAAGACTCCACGACTTCCAGGGGAAAGCAAGAGAGACAAGCAAGTGGTGTATGTC
 AGGAGAAGAAAGGGAAGGGTCTCTTGGCTCCCAAGGGGCAAGGACGAGCCAGGAAGAGGAGCTTCAAGGGGATGGGGACGGTT
 50 GAAGGTGGAGATCAAGCAACCCAAAGAGCAAGAGGAGAAGAAATCCGACAAGAGAAAAAGACAAGAAAAAAGAAAA
 GAAGAAAGGACAAAAAGGCTCAACCAAGATTTCTGAGTCAACCGTCCCAAGAAAGAAAGAAAGAAAGAAAGAGCAGAGC
 AGACTGTATGACGAGCACCAGCACCAGGCACAGGATTTCTAGCCGAGCAGTGGCCATCCCATGCTCTGACCTCCACCGACCT
 CTGCCCCACTTGGGTGGAACTAACTGTTTACCTTCCCTCGCTCCACAGAAGAGACAGCCAGCTTCAAGGGTCCCTGTGCTGGCC
 AAGCCATGAGCTGCGGGAGGCTGGTCCAAAGGAGAAAGTGACACAGCTCCCATGACCTCACCCTCAACCAAGGAGCGC
 55 TTCAATATAGATGTGTACAGTATATGATTTTTTAAGTGACCTCTCTCTTCCACAGACCCCATGCCCCAAGGCCCTCGGAGT
 TCCACACCTTGTCTCAGATCCAGTAGGCTGACCTGTGCTCATCCCGTGGCTCGGTCTCTGGCTGATCCCGAGGCTTT
 GTCTTCTCTCGTCACTTCTTGGTGTGTTTTTGTGTTTTTTTAAATAACTCAAAAAAAATAAAGACTTGGAGGAAGGGT
 AAAAAAAGAAAAAAGAAAAA

HUMAN SEQUENCE - CODING
 60 ATGGCCGAGGCCAGGAAGCGGCGGAGCTACTTCCCCTGATCTACCACCATCTGCTGCGGGCTGGCTATGTGCGTGGCGCGGGGA
 AGTGAAGGAGCAGAGCGGCCAGAAAGTGTTCCTGGCTCAGCCCGTAACCTTCTGGACATCTATACACACTGGCAACAAACCTCAG
 AGCTTGGTTCGGAAGCGGAAGGCAGAGGAAGATGCGGCACTGCAAGCTAAGAAAAACCGTGTGTGAGACCCCATCAGCACCTCGGAG
 AGCTCGGAAGAGGAGGAAGAAGCAGAAAGCCGAAACGCCAAGACTAGCATCTACCAACTCTCAGTCTGGGGGCG
 65 GGACTTGCATCAAGCATGAAAGAAAAAGCCAAGGCAGAGACAGAGAAAGCTGGCAAGACTGGGAATTCATGCCACACCTGCCA
 CTGGGAAGACGGTGGCAACCTTCTTCTGGGAAGTCTCCAGGAAGTCTCAGCAGAGCCCTCAGCAAACTACTACGTTGGTCTCAGAA
 ACTGAGGAGGAGGCGAGCGTCCCGGCTTGGAGCTGCTGCCAAGCTGGGATGGTGTGAGCGGGCCAGGCCAGCTGCTCAGGCGGAAGGC
 GGACACCTCCAGCTCCAGTGATGAGACAGCAGTGGAGGTAAAGGCTCTGAAAAAATTTCTCAGGTGAGAGTGTGCTCAGCCCTG
 CCAAGGGGACCTCTGGGAAGGGGCTACCCAGCACCCCTGGGAAGGCAGGGGCTGTAGCTCCAGACCAAGGCAGGGAAGCCA
 70 GAGGAGGACTCAGAGAGCAGCAGGAGGAGTCTATGACAGTGAGGAGGAGACGCCAGCTGCCAAGGCCCTGCTCAGGCGGAAGGC
 CTGAGAAAAACCTCTCAGGTGAGAGTGTGCTCAGCCCTGCCAAGGAGTCCCCCAGGAAGGAGTGTGCTCAGCGCCCTCTGGGA
 AGACAGGGCCTCAGTTGCCAAGGCCAGGCGGGGAAGCGGAGGAGGAGTCTCAGAGCAGCAGCAGGAGTCTGAGCAGTGAGGAG
 GAGGCGCCTGCTCAGGCGAAGCCTTTCAGGAAGGCCCCCCAGGTGAGAGCGCCTCGGCCCTGCGCAAGGAGTCCCCCAGGAAGG
 GGCTGCCCCAGCACCTCTTAGGAAAAACAGGCGCTGAGCGGCCAGGTCCAGGTGGGAAGCAGGAGGAGTCTAAGAAGCAGCA
 75 GCGAGGAGTCAACAGTCAAGAGAAAGCACTGGCAGCTGAATGACAGTCAAGTGAAGCCCTTGGGGAAGGCCCCAGGTGAAA
 CCTGCTCTACCATGGGCATGGGGCCTTGGGGAAGGCGCGGCCAGTGCCACCTGGGAAGGTGGGGCTGCAACCCCTCAGC

CCAGGTGGGGAAGTGGGAGGAGACTCAGAGAGCAGTAGTGAGGAGTCAACAGACAGCAGTGATGGAGAGGTGCCACAGCTGTGG
CCCCGGCTCAGGAAAAGTCTTGGGGAACATCCTCCAGGCCAAACCCACCTCCAGTCTGCAAGGGGCCCCCTCAGAGGGCAGGG
CCTGTAGCCGTCCAGGTCAAGGCTGAAAAGCCATGGACAACTCGGAGAGCAGCGAGGAGTCTGTCGGACAGTGCGGACAGTGAGGA
5 GGACACAGCAGCCATGACTGCAGCTCAGGCAAAACAGCTCTGAAAATTCTCAGACCAAGGCTGCCCAAGAAAACCAATACCA
CTGCATCTGCAAGGTGCCCCCTGTGCGAGTGGGCACCCAAACCCCCGGAAAAGCAGGAACCTGCGACTTCTCCAGCAGGCTCATCC
CCAGCTGTGGCTGGGGGCACCCAGAGACCAGCAGAGGATTCTTCAAGCAGTGAGGAATCAGATAGTGAGGAAGAGAAGACAGTCT
TGCACTAACCGTGGGACAGGCAAGTCTGTGGGGAAGGCTCCAGGTGAAAGCAGCCTCAGTGCCTGTCAAGGGGTCTTGGGGC
AAGGGACTGCTCCAGTACTCCCTGGGAAGACGGGCTTACAGTCACCCAGGTGAAAGCTGAAAAGCAGGAAGACTCTGAGAGCAGT
10 GAGGAGGAATCAGACAGTGAGGAAGCAGCTGCATCTCCAGCACAGGTGAAAACCTCAGTAAAGAAAACCCAGGCCAAAGCCAACCC
AGTGTCCGCGCAGAGCACCTTTCAGCAAAAGGGACAATTTAGCCCCCTGGAAAAGTTGTCACTGCAGCTGCTCAAGCCAAGCAGAGGT
CTCCATCCAAGGTGAAGCCACCAAGTGAGAAACCCCAAGAACAGTACCGTCTTGGCGAGGGGCCAGCATCTGTGCCATCTGTGGGG
AAGGCCGTGGCTACAGCAGCTCAGGCCACAGAGGGCCAGAGGAGGACTCAGGGAGCAGTGAGGAGGAGTCAAGCAGTGAGGAGGA
GGCGGAGACGCTGGCTCAGGCGAAGCCTTTCAGGGAAGACCCACAGATCAGAGCTGCCCTTGGCTCTGCAAGGAGTCCCCAGGA
AAGGGGTGCCCCAACACCTCTTGGGAAGACAGGGCCTTCGGCTGCCAGGCAGGGAAGCAGGATGACTCAGGGAGCAGCAGCGAG
15 GAATCAGACAGTGATGGGAGGCACCGCAGCTGTGACCTCTGCCAGGTGATTAAACCCCCCTGATTTTGTGACCCCTAATCG
TAGTCCAGCTGGCCAGCTGTACACCCGCACAAGCCAGGCTGCAAGCACCCCGAGGAAGGCCGAGCCTCGGAGAGCACAGCCA
GGAGCTCCTCCTCCGAGAGCGAGGATGAGGACGTGATCCCCGTACACAATGCTTGACTCCTGGCATCAGAACCAATGTGGTGACC
ATGCCCACTGCCACCCAAGAATAGCCCCCAAGGCCAGCATGGCTGGGGCCAGCAGCAGCAAGGAGTCCAGTCCGATATCAGATGG
CAAGAAACAGGAGGGACAGCCACTCAGGTGTCAAGAAGAACCAGCTTCCCTCCCACTGACCCAGGCTGCCCTGAAGGTCTCTCG
20 CCCAGAAAGCCAGTGAGGCTCAGCCTCTCTGTGTCAGGACCCAGCCTTCAAGTGGGGTTGACAGTGCTGTGGGAACACTCCCTGCA
ACAAGTCCCCAGAGCACCTCCGTCCAGGCCAAAGGGACCAACAAGCTCAGAAAACCTAAGCTTCTGAGGTCCAGCAGGCCACCAA
AGCCCCGTAGAGCTCAGATGACAGTGAGGACAGCAGCGACAGTCTTTCAGGGAGTGAGGAAGATGGTGAAGGGCCCCAGGGGGCCA
AGTCAGCCACACGCTGGGTCCCACCCCTCCAGGACAGAGCCCTGGTGGAGGAGACCCGAGCAGAGTCCAGCGAGGATGATGTG
25 GTGGCGCCATCCCACTCTCCTCTCAGGTTATATGACCCCTGGACTAACCCAGCCAATTCCAGGCCCTCAAAAGCCACTCCCAA
GCTAGATTCCAGCCCTCAGTTTCTCTACTCTGGCCGCCAAGATGACCCAGATGGCAAGCAGGAGGCAAGGCCCAACAGGCAG
CAGGCATGTTGTCCCTAAAACAGGTGGAAGAGGCTGCTTCAGGCACCACTCAGAACTCCCGAAGCCCAAGAAAGGGGCT
GGGAACCCCAAGCCTCAACCTGGCGCTGCAAGCAACATCACCCAGTGCCTCTGGGCCAACCCCTGGCCCTGAATGAGGCCCA
GGTGCAGGCCTCAGTGGTGAAGGTCTTGACTGAGCTGTGGAACAGGAAAGAAAGAGGTGGTGGACACCACCAAGGAGAGCAGCA
30 GGAAGGGCTGGGAGAGCCGCAAGCGGAAGCTATCGGAGAGACAGCCAGCTGCCAGGACCCCAAGGAGCAAGAAAGAAAGAGCTG
GGGGCCGGGAAGGTGGGAGGCTCTGTTTCCCAAGAAAGACCTCCACGACTTCAAGGGGAAGCAAGAGAGACAAGCAAG
TGGTGATGTCAAGGAGAAGAAAGGAAGGGTCTCTTGGCTCCCAAGGGGCCAAGGACGAGCCAGAAGAGGAGCTTCAAGGGGA
TGGGACCGGTTGAAGGTGGAGATCAAGCAACCCAAAGAGCAAGAAGGAGAAGAAGAAATCCGACAAGAGAAAAAGACAAGAA
AAAAAGAAAAAGAAAGAAAAAGGCTCAACCAAGATTCTGAGTCACCGTCCAGAAAGAAAGAAAGAAAGAAAGAA
35 GACAGCAGAGCAGACTGTATGA

MOUSE NOMENCLATURE
ICSGNM Pim1
Celera mCG21141

HUMAN NOMENCLATURE	
HGNC	PIM1
Celera	hCG33220

[illegible]

470

471

472

ATGTGTGTATAGTTCGGCATGGTAGCCTGCAAAAGGACTGTAGATGATAACAATTTTAAAGAAGAAAAAAATGCCCTTTAAGTT
 ATTTTATGTGTTGGGGTTGGTTGGTTTTTTGTTTTTTTCTTTTATTCTTTTGTCTGTTTTTGAAGATG
 GCACGTTCTAGCCCGGAAGTTTAAATGATTTATTTATTTATTTGTTGCTTCTGTCCAGCTTCCACTGACTGTGGCC
 CCGGTTTATGTCAATGTTCTGCCTTTTTTTCTTCTCTCTCTGACTTGGGACCTTTAGGGGAGGGCTGTGACGCTTGCT
 5 GGGGTGTTGGGGTCCGGTGGGACAGCTGCTGTAGCCCCCTTCTCAGGGGCCCCCTTGGCTGCTGTGCTGAGTGGGTCTAGGGTC
 TGCTGACTGTACATAAGACAGTTCCGGTGTGGTGTGCCTTCCGGATCCTCTGTGGGCTGTGCTTTGAGCAGCGTCAGCCCGCTG
 GTTTATCTGAGTAAAGTATACTGTACAGGGGAATAAAGAGATCTTATTTTTTTTTTATACTTGGCATTTTGAATAAAAAC
 CTTTGTGCTTAAACCTTTGAGTTTCCATTCAATACAAAGATGTATGCTTGGTACAGAGCCAGGTAGACTGGGCATTTTCA
 10 CTAGATCTGATTTCTGTGCGGCACAGAGAAGTACCAGGCTTCTGAACAAACCATGCTGGATAAAACCCAGGCTTCCGTGCCC
 ACTCTACCAAGGAACTCCCTGACTATGACCAATCCCTTTAACAAGTTTAGGGATTGTACCTTTTCAAGCAGGTGCAACCA
 AATTACAGCACCGGAACATGGGACAAGACTTGGCTAGGACTAAATTTTCTGACGTGTATGTACAGAGTGTGCAACATTTT
 GAGTTCATCAGACAATGTGTTGACGGAATTAACAGGTAGCATTTGATTGGTTTTTGTTTTAAAGATTTTATGTATGTAGT
 ACCTGTAGCTGTATCAGAACAGGGCATCAGGTCCCATCACAGATGGCTGTGAGCCACCATGGGGTGTCTGGGAATTGAACCTCAG
 15 GACTCTGGAAGAAGCAGTCAGTGCTCTTAACCATGAGCCATCTCCAGCACCTGGTCTGTGTAACCTCATAGCAGGTTCTCT
 TGAGCTCTAGCTGTACTAGGGCTGTAGATGAGGCTGGCTCAGCTCAGACCTACCGCCCGCTTGGTGTAGTGACGAGGCTAGT
 GTTTTGTACACAGGTTTGAAGTCTGTGTAGCCTTGGAACTTGATATGTATAGACCAGGCTGGCTGAACCTCTGGATCTGCCTG
 CCTTGGCTCTAAGTGTGGGATTAAGGCGATGTATAGTTCCAGTGGAAAAGATTGGGAGCCAGGATCTAGCATCTCTCTAG
 CAGAGTGGTGAATCCTATAATCCAGCACTTGGGAATAAGAGGATGAGAGTCAAGGTCAAGTCTCAGTCTGAGTCTGGGATAC
 20 TCGTGACTGTCTAATCAGCTGGAAAGATGCACTCTGGTAGACAGGACCAAGGAATTC

 MOUSE SEQUENCE - CODING
 ATGCTCTGTCCAAGATCAACTCCCTGGCCCACTGCGCGCCCCCTGCAACGACCTGCACGCCACCAAGCTGGCGCCGGGCAA
 AGAGAAGGAGCCCTGGAGTCGAGTACCAGGTGGGCGCGCTGTTGGGACGCGTGGCTTCTGCTCTGCTCTGCTCCGCG
 25 TCGCGCACAACTTGCCTGGGCACTTAAGCACGTGGAGAAGGACCGGATTTCGATTGGGGAGAACTGCCAATGGCACCAGGTG
 CCAATGGAAGTGGTCTGTTGAAGAAGGTGAGCTCGGACTTCTCGGCGCTCATTAGACTTCTGGACTGGTTCGAGAGGCCGATAG
 TTTCTGTCTGACTCTGGAGAGGCCGAACCGGTGCAAGACCTCTTCGACTTTATCACGAACGAGGAGCCCTACAGAGGACCTGG
 CCCAGGAGTTCTCTGGCAGGTGCTGGAGGCGCTGGCGCATTCGCAACAACCTGCGGGTCTCCACCGCGAGTGTGAGAAC
 ATCTTAATCGACCTGAGCCGCGGCAAACTCAACTCATCGACTTCTGGGTGCGGGCGCTGCTCAAGGACACAGTCTACAGGACTT
 TGATGGGACCCGAGTGTACAGTCTCCAGAGTGGATTCTGCTACCATCGCTACCACGGCAGGTGCGGAGCTGTCTGGTCCCTTGGGA
 30 TCCGTCTCTATGACATGGTCTGCGGAGATATCCGTTTGAGCAGCATGAAGAGATCATCAAGGGCCAAGTCTTTCAGGCAAACT
 GTCTCTCAGAGTGTACGACCTTATTAATGGTGCCTGTCCCTGAGACCGTCAAGTCCGCCCTCTTTGAAGAAATCCGGAACCA
 TCCGTGATGACAGGTGACCTCTGCCCCAGGCACTTCTGAGATCCATCTGCACAGTCTGTACCGGGATCCAGCAAGTAG

 HUMAN SEQUENCE - GENOMIC
 35 GGCTAATTTTGTATTTTAGTAGAGATGGGGTTTCTCCACATTGGTCAGGCTGGTCTCGATCTCCCGACCTCAGATGATCTGCCCG
 CCTCGGCTCCCAAAGTGTGGGATTACAGGCATGAGCCACCGTGCCTTGCCAACCCGCTCTTTAAAAAATTTTTTTTACCGG
 CAGGCACGGTGGCTCAGGCTCACTTCCAGCACTTTGGAAGGCCGAAGCAAGTGGATCACTTGAGGTGAGGCGTTCGAGGCCAGC
 CTGGCCAACTGGTGAACCCCTGTCTACTATAAAATACAAAAATAGCCAGGTGTGGTGTATGCGCTGTATCTCAGTACTC
 40 GGGAGGCTGAGGCAGAAGATTGCTTGAACAGGAGGCGGGGTTGCACTGAGCCAGATCATGCCATTGCACCTCAGGCTGGGC
 GACAGAGAAGACTCCATCTGAAAAAATTTTTTTTTTACAAATATGATCTCTGCACTTGAAGAGCTGATGGTCTCATTGGGG
 AAACATGAGTCTTTCAAAGTGGGTATTAATTAATGCTGTCTCTTAAAAATGATCTATAATGACAGTAACTACTTAGATAA
 CAAAGAATATGATTGTATCAGATTAGTATTACAAGTAAGTCTGTGAGTTAAAAACTATTGGCTGGAGTGGTCAGGGAAGCTG
 45 TAAGAAGTCCAAAGTGGCTTCAAGTGGTCTGAAGGGAACAGACAGAAATTTGGGGATGTGTGTCAATTTGGGTAAAGAATGTAATC
 TGTGTGTCTTTAAGCCCTGCATCAGAGGACAGCTATTGCCAACATAACTCCATTTACAAGAGTAACCTCAGATAAAACCCCTG
 ATGACTGCCAAGTCTGACTTTCTATCTAGTGTGGTGTCTCTTAATAAGTAGCATCACTGAACACAGAAGCAAGCTTAACCT
 TATCAGGGAAGAGTACACCACTTCTATAAGGGAACAGCACAGCTCCCTAGTTCTCCAGAGTGAGCAAGATTGATTAGACT
 GCAAGAATCTCTGACAAAGTAAATACATTGAAGGCCATAAAAAACAGCTCTGTATCTGTAGTATAGTTGTTCTAGTTCTGGCTGTG
 50 GTGAGCTGTATGTTTGTAGCAGATGCCACTAAAAGAGAAGTAAACAGAGTTGGAAGAGGAGGATATGTTGAAAT
 GTAAGTTTCTCAAATATTAGTAGATTTCGTCCTTACTACATGTCTTTTTATCATTGGAACCTCTGTA
 GTATTAAACACGATATAAGCAATATTCTAACTATAAGCTTCAAAGGATTATTTGAATAGAGAATCTTCTAGTTTCTTCTCA
 GTAGACTGAAATAGCCAGGCACAGTGGCTGACGCTGTAATCCAGCACTTTTGGAGGCCGAGGTGGGAGATCAGAGGTGAGGA
 55 GTTCGAGACAGCCTGGCCAACATAGTGAACCCCTGTCTACTAAAAATCACAAAAAGTAGTGGGCATGGTGGCGCTGCTGTA
 GTCCAGCAACTGGGAGGCTGAGGCAGGAGATCGCTTGAACCTGAGAGGTGAGGTTGTGGTGTAGCCGTGATCGTCCACTGCA
 CTCCAGCCTGGGCAACAGAGGAGACTCTGTCTCAAAAAAAGAAAGACTGAAATAAAATATCTGTCTCTTTGCAACATG
 ACATCAGGAGCTCCTACTAATCTCTCTGGCTTCTGCTTTGATTAAAAACTTTTGGGCGGGAGCGGTGGCTCAGGCTGTA
 60 ATCCAGCATTTTGGGAGGCTGAGGTGGGTGGATCAAAAGTGAGGAGTCAAGACCAGCCTGGCCAAAGATGGTGAACCCCTGTCT
 CTACCAAAATACAAATTAGCTGGGTGTGGTGGTGACACCTGTAATCCAGCTACTCGGGAGGCTGAAGCAGAAGATCGCTT
 GAACCATGAGGCGAGTGTGCACTGAGCCGAGATCGGCCACTGCACTCCAGCCTGGGTGACAGAGCGAGACTCCGTCTCAAAA
 AAAAAAAGAAAGAACTTTTATTCAATTCATTCATGCTATTGGGGAATACAAAAAACAACACAAAGCATCTTTTGTCTTC
 65 ACTTCTGACTCTACTCACCCTGTTCTCTCTCTCTCTACTTACTCGTATTTTACTCATTAAAGCTGAGTTAAGATCTACATC
 TTCCATGAGGCTCCCGGAGCTCTTCAAGCTCTCTGAACTTGACTTTGTGGATGATGCTATCAGAACTTAATCAGAGAAGACC
 TGTTAATCTCTTTTTTTGTTGTATGTTAGAGACAGGTTCTGACTGTGCGCCCTGGTTGGAGTGTAGTGGCACGATCAAGGCT
 CACAGCAACCTCTGCTACCTGGGCTCAAGCAGATCTCTCTCCGAGCTCAGCTCCCGAGCAGCTGGGACTACAGGTATATGCCAT
 CACATCCAGCTAATTTTGTATTTTGTAGAGACGGGTTTCAACATATTGGCCCACTGGTCTTTAATCTCTGGGCTCAAGTGA
 70 TCCCTTGAAGAGGCAAGTGGCATGGTGGGTAGGAGATTGCTCTGCCACTTAACAGTGTAGCCTTGGGCAAACTACTTATCTGT
 TCCGTTATTTATCTGTAACCAATGAAGATAGTAAATGCCCACTCATAGGATTATATGGGATATTAATAGAACAAATGCCCT
 AGCAGATCATTGATGCTCAATATTGGCTTTTAGTACCTATCTCTTTGCCCTCCCGCAATGATTTTCATTCTTAGCCTTTAT
 GTTCAATTAAGAGGATGATGGTTCTGCTCTCAATATATTTATAGTCTAGTTGTAGAGATGAGACAAATACAGAAAAATAGACTAT
 75 ATACTATTAGATGACAAATAGATACAAATAAGAAATGTTTTCATCACTTCTTTGTAGTGCTTACAAGGATGTTCCATGAAT
 CTTTTTGCATTTTTTTTATTTTACCTTGATGAACCTTTTGGGCTTTTCAAAGTCTTACATCAGCAATTTTATTTTACTTTAAAA
 GATGGTAGAATCCCTCACCAGCTCTAGATAGAAGACATCTCTCTCTCCCTCACACACACACACACACACACACACACAC
 ACACACGACAGACAGATGGCCCTTTCTTTGTAGTGTAGACATGACGCTTTTGTTCATGTGTCTGCTGGTGTCTGATCT
 GAGGATACATTTTCTAGTCTTCTAATAAGGATTTTATAACAGTCTCCAGGCTTCTGTAGCCTTTATATGTTCTAAGTACTC
 CTTTTATATTCATCTATCCAGCAATACTCAGGAATAAATACTTTGTGTATAATGCCCTCAGTAAATATTATTTTACTCAAA

475

476

477

5 GACTCCGCGATCTTGGCTCACTGCAAAACATTGTGTGGATTAGCCACCTCAAGGTCCTCTCAGGGGCCAGGATCTGGAGGTGAGAA
TGTTCTTCCCCAGACTCCAGAGTTGGGTAGGCCATCTGTTCTGTGGAAATGATCATTATGAACCTCTGTAAACTATCTTTCACT
TGGGCTGGCTGGGAGGAAGAGTTGTGAGGCTGAAAGAGGGAAGAAGAAAGGGGACCGGGGGGTGGGGTGGGCGAGGGGCACATT
TCTTGTAAATGTTGCTCAGCTCCTTCAACTGCTGTGCTGGTCTTGTGAAACACTTCAACACAAAGACCTATCAAGAAGAGTGTTAA
10 AAAAGATATATGGCCTCATCTCCCGAGTTCCTTCTGCCAGCCTTGACCTACTAACCCCGATGCTCCAGAGCAAGTTGACAGTGTCC
CCTCAGCAGTGTCTGTGGGAGGAGTGA AAAATAGCAGAACTAGGCGCAAGACAGCAGGAGCTGTCTTTATTTTATTTATATATA
CAGGACATCCGATGTACAGAAGTGGATTATCATATAATCCTTGGCTCATCGTATATTTCTCATCTTGGTCCAAGAAATGGCTTTTGT
TTATTTAAATCGGAGTCTGTGCT
ACCCAGGCTGGTATGTCAATGACGTGATCTCGGCTCATCTGTAACCTTCACTCCAGGTTCAAGTAATTTCTCTGGTTGACGCTTCC
15 AAGTAGCTGGGATTACAGGCGCCTGCCACCACGCGCGCTAAATTTTTGTATTTTTAGTAGAGACAGGTTTCGCAATGTTGGCCAG
GCTGATCTCGAACCTCTGACCTCAGGTGATCCACCTGCTCGGCTCCCAAGTGTCTGGGATACAGCGCTAGGCCACCGCATCTG
GCCCGTTATTTATTTATTTATCTATCTGGGTAGTGAATCCACCACCCAGCTCAAAAGAACAGAAATTAACAATGACATCATCTA
TCTATATGATCCTCTCTTAGTCCATTTCTTACCTCCCCAGATACAACCCACTGTCTCTAAATTTTGTGTTTGGCATTCTCTTACTT
TATATTTTATTTATTTATTTTGGACAGAGCTCACTCTTGCCAGGCTGGAGTGCAGGTGGCATGATCTTGGCTCAGTGCACCTCT
20 ATCTCTCTGGGTCAAGCGATTCTCTCGCTCGGTCTCCGAGTAGTGAGATACAGGATGTGCCACCATGATTTTGTATGTT
TAGTAGAGACAGGGTTTACCATTGTTGGTCAGGCTGGTCTTGAACCTCTGTCTCAGGTGATCTGCTCGCTCAGCCTCCCAAATT
GCTGGGATTACAGGCATAAGCCACCATCGCCGGCTTATTTATTTTACTTTTGAGCTTGTACCCAGGCTGGGGTAGTCGCGCAA
TTGAGGCTCACTGCAGCTCAAAATCTGCGGCTCAAGTGATCTCTGCTCAGCCTCCCAAGAGCTGAGACAGACAGATGTTGC
25 CAACACACCTTGTCAATTTTTTTTTTTTGGAGTGGAGTCTTGCTCTGTGCGCTCGGCTGGAGTGCAGTGGCCAACTTAGGCTCA
CTGCAAGCTCCACCTCTCGGGTTCAGCGCATCTCTCGCTCAGCCTCCGAGTAGCTGGGATACAGGTGGCCACACCGCT
GGCTAATTTTTTGTATTTCTAGTACAGACAGGGTTTACCATTGTAGCGAGTGGTCTCGATCTCTGACCTCTGATCTCGCC
CGCTCAGCCTCCAAAGTGTCTGGGATTACAGGGTGTAGCCACCGTGGCCAGCCACCTTACTAATATTTAAATTTTTTGTAGAGA
TGGGTGTCTCACTATGTTGACCAGGTTGGTCTTGAATTCCTGGCTCAAGCAACTCTCAAACTCAGCCTCCAAAGTGTCTGGGAT
TACAGGCTGACCACTGTGCCCGGTCAACTTTTAAATTTTTATAGAAATAGGATTTTGCAATGTTGCCAGGCTGGTCTCAAA
25 TCTGGGCTCAAGTATTCAACCGCTCGGCTCCAAATGTTGGGATTACGATGTGAGGTACTGCACCTGGCTAACAGCATAG
CAGCATCTTTCACTTTAAATACATTTTATTTATAGGTATGTATCCTTAAATATGGAGTATTTAGTATTTTATTTTGTCTT
ATTTTATTTCACTTTTATTTAGATGGAGTCTGTTCTGTGCGCCAGGTTGGAGTGCAGTGGTGCATCTCGGCTCACTGCAAACT
CTGCTCCCGGTTCAAGTGATT

30 HUMAN SEQUENCE - mRNA
GAGGAGGCCCGAGAGAGGTCGCTGGCAGCGCGCGCGGACCGGCAGCAGCAGCAGCAGCAGCAGCAACCACTAGCCTCCT
GCCCCGCGCGTTGCGAGCAGCGCCACGAGCCGCTCACCCGCGCTTCTCAGCGCTGCGCGACCCGCTGGCGGCGCTCCGCGCGC
AGTCCCGGCAGCGCCTCAGTTGTCTCCGACTCGCCCTCGGCCCTTCGCGCAGCGCAGCACAGCCGCACGCACCGCAGCAGCAGC
35 GCACAGCCCGAGCATAGCTTCGGCAGCAGCCCGGCTCGGCTCTCGCGCAGCGCAGCTCTCTGGCAGCTCCCTTGGCGCGCATCTTGGGA
GGTTGGATGCTCTGTGCCAAATCACTCGTTGCCACTGCGCGCGCGCCTCGAACGACCTGCAGCCACCAAGCTGGCGCC
CGGAAGGAGGAGGCCCTGGAGTCCGAGTACCAGGTGGGCCCGCTACTGGGCAGCGCGCGCTTCGGCTCGGTCTACTCAGGCA
TCCGCGTCTCGCAGAACTTGGCGGTGGCCATCAACACAGTGGAGAAGGACCGGATTTCCGACTGGGGAGAGCTGCCCTGGCACT
CGAGTCCCATGAGGTGCTCTGGCAAGAAGGTGAGCTCGGTTCTCCGCGCTATTAGGCTCTTGGACTGGTTCAGAGGCC
CGACAGTTTCTGCTGATCTGGAGAGCGCGAGCCGGTGCAGATTTCTTCGACTTCATCAGGAAGGGGAGCCCTGCAAGAGG
40 AGCTGGCCCGCAGCTTCTTCTGGCAGGTGCTGGAGGCCGTGCGGCATGCCACAACCTGCGGGGTGCTACACCGGCACATCAAGGAC
GAAACATCTCTTATCGCACTCAATCGCGCGGAGCTCAAGCTCATCGACTTCGGTGGGGGCTGCTCAAGGACACCGTCTACAC
GGACTTCGATGGGACCCGAGTGATAGCCCTCAGAGTGGATCCGCTACCTCGTACCATGGCAGGTGGCGCGCAGTCTGGTCCC
TGGGGATCTGCTGTATGATATGTTGTGTGGAGATCTCCTTTCGAGCATGACGAAGACATCATCGGGGCGAGGTTCTTCTCAGG
CAGAGGGTCTTCTCAGAATGTCAGCATCTCATTAGATGGTCTTGGCCCTGAGACCATCAGATAGGCCAACCTCGAAGAAATCCA
45 GAACCATCCATGGTGCAAGATGTTCTCTCGCCCGAGGAATCTGCTGAGATCACTTCACAGCGCTGCGCGGGGGCCAGCAAAAT
AGCAGCCTTTCTGGCAGGTCTCCCTCTCTTGTGATGCCCCGAGGAGGGGAAGCTTCTGCTCCAGCTTCCCGAGTACCAAGT
ACACGCTCTCGCCAGCAGGACAGTGCCTGTATACAGGAACAACATTTACAATCTTCAGATTCAGATCCGAGGCCCTGGAGGCTGCCCTCC
CAACATGGGGGAAGAGTGACTCTCAGGGGCTCTAGGCCCTCAACTCTCCCATAGTACTCTCTTCTCATAGAGTGTCCAGCAT
TGCTGACTCTGAAATATCCCGGGGGTGGGGGGTGGGGGTGGGCAGAACCTGCCAATGGAACCTTTCTTCTCATCATGAGTCTGCTG
50 TGAATGCCGCGATGGGTGAGTGGGGGGGAACAGGTTGGGATGGGATAGGACTAGCACAATTTAAGTCCCTGTCACCTCTCCGA
CTCTTCTGAGTGCCCTCTGTGGGACTCCGCTGTGCTGGGAGAATACTGAACTTGCTCTTTTACCTGCTGCTCTTCCAAAA
ATCTGCTGGGTTTTGTTCCCTATTTTCTCTCTGCTCCTCACCCTCCTTTCATATGAAAGGTGCCATGGAAGAGGCTACA
GGGCCAAACAGCTGAGCCGCTGCCCTTTTTTCTGCTCCTTTAGTAAACCTCCGAGTGAACTGGTCTTCTTTTGTGTTTTTACTT
AAGTGTGTTCAAGGCAACCTCACACACAAAAATGCAACAACCAAGCAATCAACGAAGAGTGAATGTGTGATGATGCAAGT
55 GGCATGGTAGTATACAAAAGATGTAGTGGATCTAATTTTAAAGAAATTTTGCCCTTAAAGTATTTTACCTGTTTTGTTTCTTG
TTTTGAAAGATGCGCATTTAACTTGGAGGTCAATGTTATGTATTTATTTATTTATTTATTTGTTCTCTTATTCCTCAAGCTTC
CATAGCTGCTGCCCTAGTTTTCTTCTCTCTCTCTGACTTGGGACCTTTGGGGGAGGCTGCGACGCTGCTCTGTTT
GTGGGTGACGGGACTCAGGCGGGACAGTCTGCAGCTCCCTGGCTTCTGTGGGGCGCTTCCCTACCTACTACCGAGGTGGGTCCGG
CTCTGTGGGTGATGGGAGGGGCCATTGTGACTGTGTATAGGATTAATTATGAAACACAGTCTCGATGTGTGCTTCCAGATC
60 CTCTCTGGGCTGTGTTTTGAGCAGCAGGTAGCTGCTGTATGTTTATCTGAGTGAAATCTGTACAGGGGAATAAAGAGATCTTAT
TTTTTTTTTATACTTCGCTTTGGAAATAAAACCCCTTTGGCTTT

HUMAN SEQUENCE - CODING

65 ATGCTCTTGTCCAAATCAACTCGCTTGCCACCTGCGCGCCGCGCCTGCAACGACCTGCACGCCACCAAGCTGGCGCCCGGCAA
GGAGAAGAGCCCTTGGAGTCGCGATACAGGTGGGCGCGCTACTGGGACGCGCGCTTCCGCTCGGTCTACTCAGGCATCGCGG
TCTCCGACCAATTCGGCTGGCCATCAAAACGCTGGAGAAGGACCGGATTCCGACTGGGGAGAGCTGCCTAATGGCTATCGATG
CCCATGGAAGTGGTCTGCTGAAGAAGGTGAGCTCGGGTTCTCCGGCGTCATTAGGCTCCTGGACTGGTTCTGAGAGGCCGACAG
TTTCGTCGTATCTGGAGAGGCCCGAGCGGTGCAAGATCTCTTCGACTTCATCAGGAAAGGGAGCCTCGAAGAGGAGCTGG
70 CCGCCAGCTTCTCTTGGCAGGTGTGGAGGCCGTGCGGCCTGCCAACTCGCGGGTGCTCAAGCGGCATCAAGGACGAAAC
ATCCTTATCGACTCAATCGCGCGAGCTCAAGCTCATCGACTTCGGTTCGGGGCGCTGCTCAAGGACACCGTCTACACGGACTT
CGATGGGACCCGAGTGTATAGCCCTCCAGAGTGGATCCGCTACCATCGCTACCATGGCAGGTTCGGCGGCAGTCTTGTGCTCGTGGGA
TCCCTGCTGTATGATATGGTGTGGAGATATCTCTTTCGAGCATGAGAGAGATCATCAGGGCGCCAGGTGTTTCTTCAGGCAGAGG
GTCTCTTCAGAATGTCAGCATGCTCATTAGATGTTGCTGGCCCTGAGACCATCAGATAGGCGAACCTTCGAAGAAATCCGAACCA
TCCATGGATGCAAGATGTTCTCTGCCCCAGGAAGTCTGCTGAGATCCACCTCCACAGCCTGTGCGCGGGGCCAGCAAATAG

MOUSE NOMENCLATURE
ICSGNM Wnt3a
Celera mCG11700

5

HUMAN NOMENCLATURE
HGNC WNT3A
Celera hCG42253

10

MOUSE SEQUENCE - GENOMIC

15

[illegible]

30

40

45

50

55

60

65

70

[illegible]

481

CTCCAGTATGCTCTTGGGCAACACAGGCTGTCTAGGGACAAGCAGCTGCCACAGGTCTGCCCTAGAGAGCAGATAGTCACATC
 AGCCTTGGGGCTAGGGGCGCGCCTGCCACATTCTCTGCCCTACACCTTGGCTCCTAGAGGCCACCTGCAGGACAGAGAGAAC
 TAGGCTGTCTGGCCTCAGCATCCCATCTCTTCCCATGGCAGCAGCTGGAGGATTTCTGCCAGACGGCAGCTGCACCCCTGCA
 ACTGTCTCCCTGCAACATGACTTAGGCCTCTCTCAGTTGTCTCCCTTCTTCACTCTGTCCCTCCGGTCCCCAAAGCCCC
 5 ATCTCCTCCTCCTGCTTATGCTCCCTCCTCAGTCTCTTCTCTCTCTCTCTGGTGCCAGGGAGAGAGCCCTCCGTT
 GCGCCAGAAAGGCTGGCTCCAGAGTCTTGTGCCCCCACCCTGCTGCTGCTGGCCTCGAAGTAATCAATCTGATTGGATT
 AGGGTCAGGGCAACCTAATCATGTCAAAGTTACCTTAGGCTTGTGGCAAGGACCACAGGGGTGCTGGCCACCCTGCCGAGG
 TGGCCTCTGTTGAACAGAGTTTAACATCTACCAGCCAGCTGGGAGGAAGGAGCCAGCCTCTTGCCTGATGTGTGATGTATGTG
 AGCTTGTGCAGCCATGTGTTATAGAAAAGCGTGTGTGCATGTGTTTTATATATGATGTGCGCATGAATGTCTTACGTGGGCTGC
 10 GCATCTGTGAATATGAATGTGTTGTGCCCATGTTAGTGAATATGTCTGTCCGAATGTGTGTCATGCATGGGCATATTTCACTGTG
 CATTGTGTGGATGTGCTTACGTGGGTATGTGTGAAGTATATGACTGCATGTGTGTATGGATATGTGTGAGTGTGTGCACG
 TGTCACTGCACATATACATTTGTGCACCTGTGTATGTACTCACAGGTATTGATTATATATGTATAGATGTGTGAATGGTAGCTACA
 CACAAATGCTCGTACATGTGTCTCAGGTGTCTGTCTCTGTGTGGGTGTGACCATGTACAGGTACAGGCGTGTGTGCATATGTAT
 15 ATGCAATTGAGCATGCATGTGTAATGGGTGCTGTGTATACAGGCAAGTGTGTCTCATATCTAATCCCAAAACCTCTGCCCC
 TGTGTGAGCCTAAACTCAGGATGCTAACTGAGCGTGAGGAAGCTTAGCCCTTGAATGCAGAACGAGGTCTAGAGGGCTCTGC
 TCTTGACCCCAAAGTAGCAGGGAGCGACCTACCTACTCTGGGATCAGAAAGCATTGAAGAATTTGAGTACAGGATGATTG
 TGAACCGTTTATATCCCTTAGGCAAGCCTCAGACACTTGGAGGAGGTACTAGGTGACTCCCTGTATTGACCTCTGGCAAGATG
 20 AAATGGGTGGGTGGTGCAGGGCAGCCTGGGCGAGGATAGGGTCAAGGACGAAGGTCAATAAAACAGGTGGTGCAGCTGGGA
 AGGGGACAAGTGGGAGGCTCAGAGATTGGGGGGTGGGGCAGAGTCCAGGAAGCAGGTATTAAACACTATGTGTCTTGTGAGG
 GGACAGCTTTCTTTGGCTGTGTGTGACATTTGCATGTGAAGACATAAAGGCACATGGTCTGGAGCCACAGCCATGGAAATCGGG
 TCTCTACCTGCTGTGTACGGGGGTGGCTGTGCTGGAGTCTCAGAAGCTCCTAGCTGGCTTCCCTATGAGGGAGGAGCATCTTC
 TACCACCTTGCACACTCCACCCACTTGGGGGTGGTCTCCCAAGTCCCTAAGGACTCCTGGGGGCTCACTGCTGTGTACAGGCA
 25 ACCTTTTACTCTCGAAGTCTTCTATTGGGCTTGTCTGGCTGGACAGTGTCTCAGCCAGAGCATCTTACCTCGTGTGGGTG
 GGTCCTTCTCTCAGCCTGTGACATACCTCAGGCGAGCCATACCTCAACCCATAGTGGCTGGACTTTTGGGTCCCCAAAC
 TCTGCCACAATATTAGCAGAGTTGGTGTCTTTGAACATCAGACTCTCAGTATCTGTGAACCTCACCCAGCCCTACTTGGCTT
 CTGGGACGGGAACACAGCTTGGCCTCTTCCCTCCTCCAGGCAAAACCCCTTCTGATGACTGGCTCAGCTTCTGGTGGCTCTCA
 30 GGGGTGGTCTCCACTCTCTGTGTGCTCTGAGCTATGGAAGGATCGACTCAATGAGACTAGCTCAGGACAGCCGAGCTTAG
 GGGTTCGGAGGGACAGAAAGGCGAGCTTTTAGGGAAGCAGAGTCCCAAAATCCAGGTTCGACACCCCTGACCCCCCATCCGAA
 GTGTACCAATTACGATCGTGTGGGGGTGGGGGGGCTCCCTGCTCCTGGGGGCTCTCCGGTATATCATTAACTCTCCGCTGTGG
 AGTGAAATGCTGTTGGGATTTCACAGCCCTTCCGGGTGTGAATTAAGCGTCTGAAAGAGGATTTCCTCTCGGCCCGACGGC
 35 GCGGGGGACCCCGCGGATATCCACTCGCTCGCTCGGAGCACAATGTCTCCTGAGGAGCAGCAAGATTAAAGCACAAGGAA
 AGTGAAATGCTGTTGGGATTTCACAGCCCTTCCGGGTGTGAATTAAGCGTCTGAAAGAGGATTTCCTCTCGGCCCGACGGC
 GCGGGGGACCCCGCGGATATCCACTCGCTCGCTCGGAGCACAATGTCTCCTGAGGAGCAGCAAGATTAAAGCACAAGGAA
 GCTGGCCATTGTGGGGTAAACCGCGGTGACAGTGTGCAACAAGCCGATTTCATCAGCCCCAGCAGGTCCAGCCGCGCCGGCC
 40 GCGGGGGCCCGGGCGGTGTGAGGGGCGCGGCGCAGGTGGGGCAGCGGCGATTCCGCTCCTCAGGTGGCTCTGGGGGCTTTTGTG
 CTCCGTGTGATTACCAATGCGACCCCGGACACCCCTCCGGGCGCGCGGCTCCTCGAGGCCAGGAAAGGGCTGGGGAAGGAGG
 GACGGTGGGCGAGCTTGGAGGGAGGCGCGAGGGCGGGGCTGGGCTGCAAGCTACAGCTGGGGCTGCTCGGTCTCTCGTCTGC
 CCTCTGCTGCTGTGTGTAACACGGGTGGGGGAAGGATGCCACCCACTGAATGTGTTATGGAAGCACTTCAGACATCGGAGT
 45 GGAATGGGATAGATAGATGGTTGTCTTCTCAGCGTGACAGGAGGTGACACTCCCAAGGAGGTGATGCCCATGACCTGCAG
 GCTCTGGCCAGTCTGAGCAATATGGCTATGCCATAGTTGGGCTTCTTCCACAGTGGTGGATAGTGATCTCCAGTTGGAGT
 CTGGAAATTTAGAGGACAGAGACCATCTGGAGGTGTTGCTGCAAACTCAGCCAGCTGCCAACCTTAAGCTTCTGTGGTCT
 CCAGGAGGTGTGGTGGATGTAATGTGCAGACATAGGTAAGGGTGAACCTTCTGTCTGCTGGGATTCCCTGGTCTAGTCTGTGC
 50 AGGGAAGCTTCAACAGAGATAGAGGGTCTAAATAAAGCAGATACATAGCATATGATCTAAAGGTTTCATGCCAAACTTTGGTGC
 ACCCAATTTCAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAA
 TAATAAAATAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAAAATAA
 45 CAATTTCAATAGCCACACACATGACACACGAGACAGCAGACAGCTCGTACCTGGTCTGAGAGTAGACACCTTCCATATG
 AATTGGATGAGTGGTGGATGGATGATAAATGGGTAGTAGATGGATAATGAGTGGCTGATAGATGGACAGTAGACAGATAATTGAG
 TGGGTGGTATTATTGGTGGAGGATGGGCGTATGATAAATAATGAAGTATGAAAGGAAAGGAAAGCCAGATAGTGATACTTT
 55 CCTTAAACCCAGTAAGAGCGCAGCAAGCTGAGATTGTTTCTGAGGGGAGCTTTGCTCCCCACCTCCAGGATCTGGGTGAAGAG
 ACAGTGGCTCAATTCATAATCTCCACGTGAGCTTCTGGTGTGGAATTAAGGCTGAGCAGCTGAGCAAGCTTTTGAAGATT
 TGCTTCTTTATAGAACAACTCTTCTCAGGTAGTCTTTCTTTCTTTATCTTTACCTGTATCTGATAAATAGACAGTATCTCCAGCCCT
 CCAAAAGCTCTTCTTAGCTCTGCCCCAGATGACTGGCCAGATGGGCAACACTAGTCTGTAAGAGTCTGTGCTCAGGCAACCCAC
 60 CCCCTCTCTTATGATGATCAATAGCCATTGGAAGGTCTGATGTGATGCTGCTGTTTCTGGAGGAGGTGTGCTCTTGGAGCC
 CTCACCTTATGCTGGCCATTTCTGTGAGTCAACAGAACTGAAAGGTGCTGTGTGTGCCAGGAACCTTGTGTGGTGTGCCCA
 TTCCCAATCACTCTCTGCAAAAGAGATAGCTCTGGGAGAGTGCTTCATAGCTCTGGTAGAGTGGTTCATTACCATGGTGTGCTCA
 65 AAACCTATGGGACTCTGATGGAAGCAAGGGTTCTCTCTGAGAAATGTGTTGTTCCCAAGATCCACGTTTGGCTCTGACT
 CCTGGGTAGACCAATCTTGTGGATTAAATCCCTGCCATCTAGGATGTCACTAAACATTCTGGAGCCTTCTCTTCTAGGTCT
 TCTGCAAGATGTTCTCAGTTATTATTAAGTATCTTAAGTATAGCGAAGCATGCGAGGAATGGTGTGGAATCTCAGGTCCCTGTCT
 70 TCTCTCCACACACACAGCCTTGCACTGCTGTGGTACATGGTAATTGATCATGAAAGCCAACTGACTTGTGATAAACAGGTC
 TTTGTGCTCCATGTCCCTTGTGTTCCACCATCTCTCCCTTTTGTACTGCCAAATCATCACCATTATAGGAAGGACCTTAATCT
 GGCTTTAGCAGCTGCTCCAATTCATTAAAGTAGAGACTATACATTTTTCAGAAAGAAACATTGAAACGATACAACTTTCTCTAG
 GAGGTAGATGGTATCTATTCACTGTCTAGGAATGTGAACCTCACTCTTGCATAGTGTGTGATGGTGATATCTGGGAGGTGGGTT
 75 GGGGTGGGGAAGCTTAAAGACTTTGGCTGCAGCTTGCCTCCATCTCTTTTCCAAGCATGTTCCATTTCACATTCACCTAGCC
 AAATGTGGGTTTGCAGCCACAGTCTCTCCCTGGCTTCTCAGATGGAGTTTCTGGACTACTTGGACTTTCTTACTTCTGGCCTTT
 ATTTCTTCCCGAGCTGTTGAAAGCCAGCTCCAGAACTTGCCCTGCTTGAATGATCGGAGCCCCACCTCCTCATTTGACAGT
 AGAGGAACTCAGGTTCAACAGAAAGGAGGACTTCCAGCTGCTGGTGACAGAGCTGAGCAAGAAATGAACCTTGCCTACTTCA
 AGTTCTATGTTGTTCTCTCTTCTCCCAAGGACCTTCCCTCGAGTGTGCTACAGCTCCAGGCTGTTTGGGTGTGTCTTGATA
 AGCAGGGAGCCTGAAGGCCCTTGTCTGGGCGAGGCAAGGCTAGAGTGTGGGCCCCCTTATCTTTGGAGCCAAAGAGGATGGG
 GAGGAGCGTTTGGGTGACCTTGAGCTGGATAAGGTAAACCAAGCTGCTTGAAGTGTGAAGTGTGAGGCTGTAGGAGGAGAA
 70 GACTTCTGAGTGCACCCAAAGAGAAGGTAGCTCAAGGCTCTGGCCCCAGACTCAGGTTCTATGCAGAAAGAAAGAACTGGAGT
 CTTAGGGGACAGGAGGAGTGCCTTGGCTCCTTCAAGATCAAAATAGGGGTAGAGATGTAGCTCAGTTGGAAGAATCTTTGCT
 GGCATGGACAAAATCCCCAGGTTTCAATTTCAACACTACGAAAGCTAGGCGTGGTAGCACAGCTGAATGTTAACTGTTAACTG
 GAGTTCAAGGTTCTTCTAGGCTACACAGTAAGCTCCAGGCAAGCTTGGGCTGAAGTCCCTGCCAAAAGAAAACAGAAAGAAAA
 75 AGAAAATGACGGCTCGAAGGGGTAGCCTGTGCTCTGGAATGGAATAAACAGTGAACAGATGCAGATCCACCCCGTGGGAGGA
 TCTGGACTGGAAGTGGATTCCAGAAGACAAGTCTTCCGAGGAATAGGCACAGCTGACATGTTGGGTAGATAGTGCACAGGACCTT

483

484

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75

AAATAGCTAAGTCAAGAAAAGAGCCGGTCAACTGTAGAAAAAATCTGGAACAGGGTAGATCTGAGAGCTTGAATAGAGGGGTGCAGG
TGGGTTAAGTTTAAAGCAAGTATGGGAGCGGGTAAGCATACAGTAGTTAGGATACCTTTGGTAGTTCCAGTGAACAGATGAAAAGTC
ACAGGAGAAGAGGCTTAACCAAGACCCCTCACACGCTGGGGATGCAGAGGAGACGTTGGAGCAGATCGCTCCCTGTGACTTCATG
TTCTCACAGCCCATCCCCAGAATCATGTATTTAGGGTGGACAGCCCTTGGTATTTAGGACAGTGGCTGGCTGGCTGG
CTTCTTATGTGTAAAGTCAACAGATCTTAGCTCTCAGACCTGTACCAGGAATGTTTCAGATTCTACCCAAAAGAAAG
CAATGGGAGGAGGGGTCTTGCCTCAGGAGCTGCCATGTTCCCACTGTCTTTCACAGGGGCGCCAGGGCCTCAGTCAAGACAGGC
AAGGCTAATCATCTGTGGCAAACCAATGATGGGGCAGGTGTAGGGGCGCCCTGGAGTGAGGCTAGAGATCTCTCACAAAGCC
ATACCTCTTTTAAAGCCACACATCTGCCCAAGCAAGCCTACCATGTCTCTGCTCTCTCCCTGGTCCCCCATCTCCATCCCCATAC
TGTCACACCTCTGAGTCTTATCTGATGTCCAGATGTAGGGCAAAGGATGCCCTGCAAAGCTGAGAGCAGCAGTCCAGTCTCTA
CCTCTCAAAACCCAGCTGAAGCCGAGTATAGCAGTGCACGCTTTAATCCAGCACTCGGGAGGCAGAGGCAGGTGGATCTCTGA
GTTACAGGACAGCCTGGTCTACAGAGTGAGTTCAGGACAGCCAGGGCTACACAGAGAAACCTTGTCTTGAAAAACCCCAAGAAAT
AAAAAATTAAAAATTAAAAATTAAAAAACAAGGGGAAAAAAGCCCAAGTTGAGCACAGTATTGTTCTTGTGTCCCATTTATAT
CCCAACCCAGATCCAAGTGATTTGAAAGCCAGTTAGAAAGATGGCCATAAAGAAATAGCCTAGGAAGTGTCTTATGATGTCCAAGGTC
CTTTAGCTGTCTGTATACATCATGACCTCATGAACCTTAGAAGTCTAGGAAACCTGCTGGCCTCTAGAGGACCAAGGAAAGGATCT
GAAATATAGTCACTGTTGACATAGGGGAATGCTGGTTAGGACAACAGGAAGATCATTAAGTGTCTCTCAACCTCCAGGGGAC
AGTGGGACTGCTCTGCCAGAGAGGGGAAGATAATTCCAGACCTTAAGAGCTGGGAAGAGAGGCAGTGAAGTGAGAGAGAAAC
AGGCAAGGCCCTCTAGACCCATTGATTCAACACTGTAGAGTTGGTGGTGATGACAGCTAAAGCCGAGGTGCTGTCCCATGTC
CTGTGTAATTTGTCCACAGGCTGGTAACAGAACTATGTACACTGCTGAAACTCTGAATGCCACTTGTGAGAGCAGGCTGCC
ACTGGTTTTATGGCAGGACCACTTAAGGGGGTCTTAAACCTTCAAAGCAATCAAGCAGGCTTAAGACCTACTAGACTCACT
GTATCTTAAAGAAGAAATATTGAGGAGCCTCCAGGTCTTGGGACATAAAGATGAGACAGGATGGCTCCATGCTGCTCAGG
ACATCTTTTGTGTCCCAACCCACTGGCTAAGCTTTCTGATCTTCAGAAACACAGATTCAACCTGTAGTGTGATCCATGGTCTGA
GTCAGCTCAGTCTACCACTAAGATTCTAGACCTCCGTTGGTCACTGTCTATACCTAAACACCAATGTGCCAGAGTCCAAGTA
GGGTACAAAAGGAATAGCCAGCCTGGCTTGAAGGTATTGGCCTATAATCAAGCTGCCCCAGAAGCTAAGGCAGAAAGGACCACAAA
CTCATGATTGCTCTGGGATACAGAAACAGGTGAAGTCAAGCTAAGCGATTGAGTGAGACCTGTGCCAAATGAAAGTGATAAG
AACTGGGGTGTACCTCAGTGACAGAGGACTTTCTTAATGTGTGAGGCTCTGGACTCCACCAAGCACTGAAAAGAAAGAAAAA
AAATACACAGACTGTGAGGGATGCTGACAGCTAAGTGGCCTTGGGAAAGGAGTGCCATCCTGGGGCTCTCTGGCCTCTGGCAGG
CTGTTTGGGGTTTGTGGAGGAAGAGGCTCAGGTTCTGGATTCTCAGTACCTCTTCTTGTAGCCTTCTGATTCTCTGGCAG
GCAGGCAGGCACTCCAATGACATCTATGCTTACACGGCTCCCTCTTCTATTCTCAGGGCTGACAGGTGTATGTACACAGGCCC
TGACCTACTATTGGCAGGACTACCTAGGATTTCCAGTAAGGGCAAGGGTCACTGGGGGGTAGGGAGGGCACTAGTGCAGGT
GACACTCCAAAAGAGGATGCCATGGTCCAGGGCCAGCCAGGCAGAAAGGATGGGCGCCCATCTCTCCCTCAGGGCAGTGAATCAT
CAGGTGAGTGGGCAGGTTCAGGAAGAGTCCAATTAGCCCGCTGGGCCATCTTGGGTGCTAACAAATATAGAGCCATCAGTCCCTAG
GGCAGTGATGAGAGTCTCAGTTAAGCCTGTCCGACAGATGAGTAGTCCCTCTAAGTTGGCACCCTGGGCAGGAGCCACCTAATT
GCTACCTGCTGCCCTAGTGCCAGATGAAAGGGACAGACTCGACTGGGAGGCGGCAGGGCAGTGGCAAACAGCATGTACAGAGG
CCCTGGAAAGTCAGAGGCCAATGGGTATGGGGTGCCAGGCTGTCTCAAGACCCAGTAGGGTCTAATGTACATGGCTTTTGGGGA
TGACAGGCCATATGCCAGGCAGAGACAGATCACTTTAGAAGGTCAAAGGCTAGGAAGCATATAGCCTACAGAGGAGGACGAT
TGGCCTGAGGGCTTGTGAGGACACAGGTGGGCTCTGGTGTCTGGTGTCTGAGTGTCTGAGCAGCAGCCCTACAGTCCAGGATGAA
AGACTACCTAGAGATTGTCTTGGCTATCCACAGGAGATACACGACTANNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
NN
NN
NN
40
GAGGATGGGAAATCCAGGCCCACTCAGACCCAAGCTCGCAGCTGTGGGCTCAGAAGCAGCCTCTCTGGTGAGTTTACAGCCC
CTCCCGCTGCCCTGGAGAAGGAGGAAATGAGCGGGAGGCTGTTCACAGGTAGTTGAGACAGCCCCGAATAACCATATAAAGGG
CCGAGGCTGGGGGGCCACCCAGCCAGGACAGGCTTGGCCATCCCTTGCAAATCTCACACTCAGTAGCTTTGAAGTACTGGAAA
GGGTGTGGCCAAACCCCACTTGAAGGCCCACTGACCTCCCTTTTCTGTACCCCTCCCTGGATGCCCTTTCTGGGTCT
GGGGCTCAGTTTCTCTCTTTCAGAGACAGACTGGAGGCTGTACCATGGCCTGGCCTCCAGGAAAACCTACTCTTGTGTGAGTGGG
45
GTGAGCCAGCTGTGGTTCACCCCTGGCTTGGGACTGAGAAATGAGCTGAGGACTAGCTTTCCATGATGTGGGCAAGTGTAT
GACCTACCTAGAGTGTCCAGGCCCAAGCAGTCTGGTAGTAGGATCTAGCACTGCTTTTCCAGGGAACACTGGGACCAACAGG
CAGCCAGGAGACAATTTGAGAAGTCCCTAGGACCTTCTGAAAGCTGACCCCACTGTGGGGTGAGAGAAAATATGATGTTT
TGTTGCTGTGTAGTGTGATCAATAGCTGGGCCAATCTGAGTCTTAGCAAACTGGCCAGCCATAATGATCTACCTTGAAGGG
50
ACTTTGGGATACATTACTGCCCTGGAGTCCAGCGAGCTCTGGGACAGATTCTTCTCCCTGGCTTTTACCTGACCATGCCCAC
AGGCCCCAGGTCACCTCTCTTCCACAGTGGCTCACCTTCCACAGCTAGTCTTTTCCAGGGTTCCCAAATTTCTTTTCAGAAAC
TCTCTTGGAGGGGGGGTACCAGAAACACACACTCTGAGATTATAGCCTTTTAGGATCATCATCTCTCTAAGGACCTCTGACTT
CCAGAGCCAGAGTAGAAACAGGTATACACCTTACTATCCCTACAGCCCTAAGGGGCCAGCTGCCATCTCTAGGATCTAGTA
TGGAAGCATATAGTCTGGGATAGTCCAGTTGGCTAGAGTCTTCTATAGATTGAATTGAAGTGAAGTGTACTCTCAATGCTACTCT
GGGCTATGTGGGAAGCTTCCAACAAGGTGTCTGCTTCTGCTTCTGATGTTTGTAAATCTGAGATACCATACAGATGCCAAGACA
55
AATAGTGAGGGCAGCTAGGAAGCCCTGGAAGGGCCCCAATCCAGGAGCTTGGGCACTGCCCTACCCTCTACCTGCTCCCTGCT
TTTGTCTGTGGGAGCTGGGACGGAGCTGCAAGCTGTGAGAAGGTCTAATGTGTGTAGCTCTAAGCCGGCTCTCTGCTCTG
GTCTTTTTCACCCCTCTCTCTCTTTTATTTGAGCGTCTAGAACTCATGGTAAATAGTCATTGGCTCTCAGAGCCCTGCAAT
TGGTGTATGTGTGGAAGATGAGGAGGACCCAGGACTAGTCCACCAAAACACAGGCCAGTGAAGAGGGAGGAGAGGGAAGGAG
60
GCATAGGCCAGCTGGGACTGGGCATCTCCACGTCCCTCCAGGCTAGCTCTCTGCTGTATCCAGGAGAGCTTCCAGGAAG
AGGCTCCTCGTCATCTTATCAGTGGGAGACTGGAGATTGAAGAACTAGAGCAGGACCCATATTAGCATAGGAGATANNNNNN
NN
NN
NN
65
AGAGAGACAGAAAAATCCAAGTACATGGGCCCTTCTTACCAGTGGCCTCCAGATTGAGACAGGAATGTATGGCTCTGTATGA
TGCTTGTGGGGTGACGGGTGTGAAGGCAGTGTCCAGAGGAATCCAAAGCCGAGCAGATGGCTGGGAGGGCTTCTCAGGAGAGG
GGACTTCCCAAGTTGTTCGCTCTCAGTGCAGAGAGCAGGCAGGCTGTGCAGAACCTCAGACTCCTTGGCAGTGGTGGCTCAGC
AGCCTCCCTTCCCATCCCCAGGCTCCTCAGTCCCTCTACTGCAGGAAGCCAGGGTGTCCACAGCCTCACTCTGCTCCCTTC
TCCATTCTGGCACAAGCTTGAGACACTCTGCCACCCACAGTGCCAGACTTTATAAGCAAGCTGGCTTCTAAGCAGCCACAG
70
ACACACAGCCCTGGAGGGGGGAGTCCCAAAGCTCTAAGAAGGCTTGAAGCTCTGATGCTTGGAGTAGACTCCAGGATTTACACA
TGCTTCTTCCCGACTGTTTTATTGTCCAGGTCTGGGTGGGGCAATAAAGTGAAGTGCCAGCTTGACCTCGGGGACCCAGGAG
TAATCTGGTGGGAGTCGTGACCCAGGCAACAGTCCATATGCCATGGACCTGATCTACACCTCCTCTGCTTAAGGATATTCATGG
TTTCCCTGTGTCACAGGTGAAGTTAACTTCTCAAGCTCAGTACCTGGCAATCTATCCCTTAAAGAGTCTCTGATGTATGGC
GTGAGAGACTGAGAAATGTCTGTCACAGGAGGTGTATACGGACATTACTCTTCAAGTGCACGGAGCCCGGCTCTATCACTCA
75
TTCCTCAGATGCTCTGGACCTCCATGCCAGCCTTCTCACCAGTTCTAAAGAAAGTCTCTCTCGGGTCTCTAGCCTTCTCTCC
CAGGTCTGAACTTTCAATGGGTCTTCTGACTCTGGAATGGTTGCAATTCTTGACCTTCTCTGGTCACATTGAGGAGCCCA

486

MOUSE SEQUENCE - CODING

5 ATGGCTCCTCTCGGATACCTCTTAGTGCTCTGCAGCCTGAAGCAGGCTCTGGGCAGTACCCTGATCTGGTGGTCTTGGCTGTGGG
 ACCCCAGTACTCCTCTCTGAGCACTCAGCCCATCTCTGTGTCAGCATCCAGGCTCTGGTACCGAAGCAGTGCCTCTCTGAGGCA
 ACTACGTGGAGATCATGCCAGCGTGGCTGAGGGTGTCAAAGCGGGCATCCAGGAGTGCAGCACCAGTTCGAGGCGCGCGTGG
 10 AACTGCACCACCGTGCAGCAACAGCCTGGCCATCTTTGGCCCTCTTTCTGGACAAAGCCACCGGGAGTCAGCCTTTGTCATGCCAT
 CGCCTCCGCTGGAGTAGCTTTTCAGTGCACGCTCCTGTGCAGAGGGATCAGCTGTATCTGTGGGTGCAGCAGCCGCTCCAGG
 GCTCCCGAGGCGAGGGCTGGAGTGGGGCGGCTGTAGTGGAGCATTTGAATTTGGAGGAATGGTCTCTCGGAGTTTGGCCGATGCC
 AGGGAGAACCGCGGATGCGCGCTCTGCCATGAACCGTCACAAATGAGGCTGGGCGCCAGGCCATCGCCAGTCACATGCACCT
 CAAGTGCAATGCCACGGCTATCTGGCAGCTGTGAAGTGAAGACCTGCTGGTGGTCCAGCGGACTTCCGACCATCGGGGATT
 15 TCCTCAAGGACAAGTATGACAGTGCCTCGGAGATGGTGGTAGAGAAACCCGAGAGTCTCGTGGCTGGGTGGAGACCTGAGGCCA
 CGTTACACGTACTTCAAGGTGCCGACAGAACGCGACCTGGTCTACTACGAGGCTCACCACCTTCTGCGAACCCTAACCCGAAAC
 CGGCTCCTTGGGAGCGGTGACCGCACCTGCAATGTGAGCTCGCATGGCATAGATGGGTGCGACCTGTGTGCTCGCGGCGCGGGC
 ATAACGCGCGCATGAGCGACGGAGGGAGAAATGCCACTGTGTTTTCCATTGGTGTCTACGTACGTGCGCAGGAGTGACACAGT
 GTCTATGACGTGCACCTGCAAGTAG

HUMAN SEQUENCE - GENOMIC

CTATGGGAAACTTCAAGCAGCCCAACATAGATGTAAGTGGAGTCCCTGAAGGCAGGACAGAGTTATCACAAGGAAGTGCCTTATG
 20 CATTTGTAGAGGCTGAACATGTCTCAAAATTCATAGGCCAGGAACCTCAGGAAGACCATAGACAGGCTCAACCCATGGCTTTCTGTG
 TCTATCCAGCAACCCAGGAAAAGAGAGAGGACAATGACTAATCTCAATAATTAGAAGGTGACATCTCTACAGATTCTATAGAT
 ATTAATAAAATAAACAGGAATAAACATCTACATGTGTATAAATCAACTCTGTAAAATGAACAAATTCCTTGAAGACATCAACTA
 CCAAGGCTCGCACAAGAAATAAATAACAAATGGTTCTATAGCTATTAAAGAACTGAATTTGGTTTACAAGCCTTCTTACAAG
 25 AAATCTAAAGGCCAGATGGCTTCATTGGTGAATCTACCAACATTTAAGCAAGACATAATAACAATTTCCACAACTCTTCCAGA
 AAATTAAGAGTTGGAAATCTCATGAGTATCTCATGAGGCCAGAAATACCTAATGCCAAATCAGACAAAGACATTATAAGGAA
 AAAAAATCTAGATCAGTACTCTCAGGAACATAGTGCAAAAGTTCTTAACCAAGTTTATGACATATCAACATATATAA
 30 AGAGGATGATACACCATGAGCAAGTGGGATTTATCCAGGAATGCAAGGTTAGTTAATATTGAATATAAATTAATGCAATTCAC
 TATATTAAATGGCTAAATAAAACATATAATTTGTCTCAATAGATGCAGAAAATCATTTAATAAATTTCCAAATTTATATAAAAA
 TCTCAGCAGATTAGAATAGCTGTGAATGCTCAACCTGATAAGTGGCATCTATGAAAACTTCAGCTCAGTCACTCACTTAATA
 AAACACTGTGTGTTTCTCTTAAACATCAAGAACACACAGCACATCCACTCTCACCCTTTTATTGACACTGTCTGGAGTT
 35 TCTAGCTAGTGCAATAAGACAAGAAAAGAAATGAAGGCTCTAGAATTTAAAGGAAGAGGTAACCTGTCTTTATTCACAGGTAA
 CACAATTTGTTATATGGAACACGCAACAAATCTACAAAAGAAATAAGTCTGCTGGAATATAAGTGAACCTTAGGACAGTTGCA
 GGAACCAACATCAATGTACTAAAAGTCAGCATCTGCAACAAAACATGGAATGGAAGAAATAATACCACTTTAAATAGCTGATAG
 CTTCTGGAATAGAGGAGCTGCAGGTAGAGGGGCGAGGTGAAGATTAGGAGAGTATGGAGGTGGTGTCTGAGCCTGATATGAG
 40 AAGAACCTGGACAGAACAGGAACAAATGCTTTGCCGAAGCTTCTGGACCCACTGGGCTGGAGGACCAACAGGAACAGCAAGG
 AAGAACCCAGCAAGGAAGCTTCTGGACCCGTTGGGTTGGAGGACAACTCAGCAACCTCTGAGGAGGAGAGACAGAACTCTCT
 GCAGAGACTGCAGTTGTGACACAGAGCTGATGGCTCGAATTTCCCTCCATGAATGGGACAGTAGGGTGGCGTGCAGTGCAGA
 AAGGGTGTGACAGAGGTGGATGCTAGGGAGGAAGCCCAAGGGGCTGATGGACTGGCCTTGTAAAGAACAAACATCATGTCTC
 45 TCTGGAGCCATGTCTCCTGTGCTCGCCAGGGACATGGGCCCCAGCTTCTTCGACAGGGAAGATGGCACTCAACCAATATATA
 ATGGCTTTTTCTCTTACCTGTCTCCCCCACTCTCCTGTTCCCTAGAACCATGTTCCACATAAACCACTGCACTCACTACTGT
 ATCATGTTCTAAATAATCCACCATGTCTCTGGAGCTCAGGATCTTCAAGGCCAAGGGGAGGCCCTAAAGGTGAAGTTGGGGGTGAA
 50 CAGAGTGAAGGAGAGCATCTCCAGTGATGAGGAGTCCAAAGACCATGATCTTGGGTGATGGGGGTGACAGGAGGAGCGTGACT
 GTCAAGCTGCCAGGCCAGGCCCATGTGTGAACAGCAGCCCTGTGAATCTTGCTCTTGGCCTCTGAGCCTTGGCTCTGGCTTATG
 CTCCAAAGATGGTGACATGCTCTCTGTGGTCTCAGGGATCAGCTGGGTGATGAGGTTTTCAGCAGGGGTGTGGTCCACCTA
 TCCCATGAGAGGTCATACCCCAAGTGAATAATCCCATTTGGCTGTCAGGACAGCCAAAGGCTAGGAGGAGGCGCCGCTGATG
 55 TCACCCCAACCTTTGCCAGAGGGGCACTGCTCTAGGGGAAGATTGGACCCAGGCACCCCTTCAGTGGCCGCTCTCTTGGCAT
 CTCACCTTGGTGGCAGTATTGGCCCAAGAGCGGAATCCAGCAAGCAGCCCAACCCGCTCCCTAAGAGCTGTGTGGCAGCAAAA
 CTTAGCTCTTTCCCAACAGGAAGTCTGGGAGTCTATTGGCTCAITTCACAGGGAAGTAAGTTATGGCTGGGAACAGGATTC
 TGGATAATTAATCTGCAGGATTCCAGAACTCCATGATAGTGTATTTTTTTTTTTTTTTTTTTTGTAGTAGTGTCTCTCTGTGCA
 60 CCCAAGCTGGAGTGCACTGGCAGTCTGCTCACTGACGCTCGAATCTTGGCCTCAACAGTCTCTCACTCAGCCTCTGCTG
 AATAGCTGGGACTACAGGTGCATACCCATACTCAGTCAATTTTTATAGAGACGGAGTCTCACTATGTGCGCCAGGCTGGTCTC
 AAATCTCTGGGTTTCAAGAGATCTGTGGCCCGAGCTCCCAAGCACTAGAATTACAGGCATGAACCTACCTGTCTGGCCATTGTG
 ATTTTTTTTTTAATCTCAAAATTTGATTTCTTATGGTCTTAAGACTCTCATCTATGGGTCCATGCTTGAAGAACATAAGATTCT
 AAGATCAGAGGGTCTACTGACTCAGTTCCTCTGCATCTATAATTTCTGTGTTGGATGATTCCAGCATTTTCAGGCTCTTTCATG
 65 GGATCAACAGGATTAACCAATGCGCTAAAGGGAGAGGCTGATGGCCCTACTTCCATGGTTCAGATTTCCAGATTTCTTCTTCA
 TAGGGAGGTCCACAATTTCCACATATCACCAGGCCACTGCAAGGAGAGCAGGTCCAAGAGTCACCTTGCAATGAGAATGAGAT
 CGTGTGCTCTACATCATGCCCCAAGGGAGAGAGGACAGCATGGAGCTAGGAGGTGGATGGCTGGGGTGTCACTGAGAAAGACA
 70 TGCCGTGTTGGACCCAGAGTTGACTTTTATGGCATCCAAGAGCTGCTGTGAGAACACACATGGTTTGAATTTGTAAGGGATGTT
 ACACAACCATCATGCGTCAGCCTTCTCAAAGGTGGCGTTCGTAGCACAGCATGCGAAGGGCTTTAGTCAACAGACATTCTCGGAA
 AGAAGCAGTGTGGGGGTATGGAAGGATCCCTGGAGGCTGGGACCTGGAGACCAGGGTCTTCTGCGGGGCCATTGCTCTTCCA
 CTTTGGCTTGGACCCCACTCTTCCATACAAGGAGAGGCTGACCTAAGGTTCCAGTTGCTTTTCATCAGGTGGGATCTGGTGAAGGT
 75 CAAAATGGAACTCTAAGATGGGTAGTTGAAGGGTGACACCCAGGAGAGAGTGATGTCTCAAAACAGACTGAATTTATTTCCCAAA
 GAGGTGCCCCAAGCCCTGCAATGCACTCTTAGGAAGTCTGGCCACTGGGCCCTTGGCCCTCGTCCCACAGGGCAGCTCAGAAA
 GGCAAGCTCATGAGGACCGGCTCGTGTCCACTACCCCTCAATGCTCAAGAGCTCCCGAGCATGCCCCCATCTGTCGCCAA
 TCTTCTGCTGGAGCCAGGAAAGGATGGCTTCTGAGTTGGAGTCTGAGTGGTCTTCCAGTCTTGGAGGGAACATATACTC
 TACAATGGTGAGCCTCGGAGAGAGCCAGCCCTGCTGTGCTGCTCAGGAGGTTGAGGCGGCTATGCTCTCTCACTCAGCCTCA
 80 CTACAGTGGGATGGTAGTCGCTGTCTCACTCCGCTCAGGAGCTTCAAGAAATCATCTCATCTGACAAACCCACATTTACCAT
 AAGGACCTTTTGGAGGCCAGGCGCAGGGGCTCACCCCTGTAAACCCACAGTTTGGGAGGCCAAGGCAAGAGGATTGCTTGAAGCCCA
 GGAGTTAGAAATCATAGTGAATATGATGGCACCCTGCACTCCAGCTGGGCGAGGAGTGAGACCTGTCTCAAAACAAATAAAA
 AAGAACCTTCGGGAGAACTGAAGGAAAGTGAATAATTTGATAAGAGATCTGGGCTGGAGAGGAGAAAGCTTTTAAATATAAATA
 85 TAACGGCAAGCTCAGAAAGATAGATACAGGGCAATGGTAAGAGCAGACAGGTAACAGATTGGGCTAGTGGGAGATGCTCATTGA
 GACAAGCAGTGCAGTGGTGTGCACTGTAGGGGGAAACGGGGATGGTGGCCCGCCATCTGCTTTGTGACTGGCGTGCACGGCA
 AGGGGGCAGAGCAACAACTTCTGTGGCTGGACCTGCTGGGCGAGGGGCAAGGGAGGCAAGACTCCGCTCTGAATTAATAATAC
 ACAGCAGGAACCCAGAGCTGTGGATATGTAGACCCACACAGCCTCCACAGAGGGCAGGTAACCCACAGGAAGACAGACAGCC
 90 CTGAGCTCAGAGCCATCTGCAAGCCCTGCCAGGACATACCCACATCAGTAATGTCCAGGGGGCTCTCATGGTGAATTAACG
 CGGAGGAGGTAATTCACAGTGCCTGAGCTGAACAAATGCCAACAAAGGTGGAGACGGGCGGAGGGACAGACAGGAATGTAGAG

AGGGGCTGCAGACAGGAAGAGCAACTCACAACCTGTGCAGGAGGGCTCATCGGCTGTGACAGGAAAACACACAGAGACTGATAGAAA
GACAGGACAGCCATAGACAGGAGGTGGGAGGCAGACAGGCTGTGGGCCAGAGACCCTGTCTCACACAGCAGCTTTGGGGAAGCA
GGTGGCCACGTCATTTCTTGTCTCTGTTGGGCTGACCTGTGTCATCTCAGGCCAGCCCTGGCTGCTGTTTTCCAGCTGCAGTT
5 CCCAACTGTGTGCTAAGGCACCCTGGGACGCCACAGCAAAATCCCAAGGTGTTGCAGAATATCACGCCGTGTAATCTAGCTCTTT
GGGAGGCCAAAGTGGGAGGATCACTTGAGCCAGGAGTTCAAGACCTGCCTGGGCAACATGGTAAGGCCCTCGTCCCTGCAAAAAA
AATTTGTTTTAAAGAAAGTACAATTGAGTCTTGGACAACATGGGGGTAGGGGCACCAACCCCTGCAAAAGTCAAAAACTTGAGTA
TAACTTTTGACTCCCTGAAAAAGAACTACTAACAGCCTCCTGTTGACCAGAAGCCTTGCTGATCCACACAGTCAGTCAGAAC
10 ATACGCTGCATGCCACATGTGTTATCCCTGTGTTCTACAATAAACTCAGCTGGAGAAAGGAAATTCCTGCTCAGAAAACTTAGA
AAAGAAGCCAGACTCACAGTTTATGAGGGCGCAGTGGGTCTCATAAAGGTCTTATCCTAGTGGTCTTATATTGAGTGGCTGAG
GAGGAAGACAGAAGCGGGGCTTGGTCTTGTGTGTCAGGGTGGCAGAGGAGGAGAAATCCATGTATAAGTGACCCACACAGTGCA
AACCCTGTGTTGTTTGGGGTACCTGTCTGTCATGAACATCACTCTGTATGGCCTGAGAGCCAGGACCTTGAACAAGAGAGTGAAG
TGTTGCTTCTGGAGGGCCAGTAACCTGAGTTATGTGAGGATGAAATAAAAAATATGATTCATTATTTTAACTGATATGATTTTTT
15 TTCAAATAGCTACTGATCATTAAAGTGGTGGACCTAATTACTTAATAAAACAAGCTCTTAGGTATTTATTTTAGCCTGAGGAGCTG
GGCAAGAATGACTATAGTTGTTTTCTTGATTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTA
CCAGGTTAGAGTGAGTGCAATCATAGCTCACTGCAGCCTTGAACCTCCTCAGCCAGATGATCCTCCATCTTGGCCTCCCA
AAGTGCCGGGATTACAGGTGTGCACCATCACACTGGCCAAATGAAAGTTTTGATCTCAAGAACCACTGCTTATGGAGAAGGAT
CCAAAGAGTGACCCCAAGGAAGGTGAGGAGGCTCCAGAGGGACCAAGTTCCAATGGAACTGACTGAGGAGGCTCCCA
20 TCTTCTGACCTGGACCCCTACCTGTCTGTGCTGTTCTTCCAGGGTCCCTCAGCCAGAAAGCCCCAGAGCCTTGAACCTGT
TCTGCCCAAACCCCTTCTCTGTTTTCCCCCACTTATTTTTGTCTAAATGAGAAAAAAGGAAAGCAAAAGATGACCAAGTATGCTG
TGAAATCCTGGCTTGGCCACCATAACAGGGACTCACACCGCTGTAGACAGGGAACCCACTACCTCACACAGCAACTGTCAT
CAGAGATGCCCCCTCCACCTGGCTTACCCACCCAGCAGGTATCTTACAGAGCTTCCGGGTGGGCGAGCCTCCTCTCGCCTGG
GGGCTATTCTGGAAGGAGGAGCAGCTCCCTGGGCCCTCCAGCAGGCCAGAAATGATGTTCCCTCCAGCACCATCCATACATGG
GGAGTTTTGTTTTATCAACACATGGCTGGCTGCTCAGGGCTTAGCTCCAGAGCTGCCCGTTGTGAGGCTTCTCACAGTGCCCC
25 TCTTGAGGACGATTAGCCCTTTCTGACGCTGGCTTGCAGAGGTCTCAGGACCTCCCGTTTGGAAAGTTGGAATGTGGGTCTG
TGCTCTGGCCAAACAAGGAGGTCTGTGGAGACAGGACCGGTCTCAGTCACCGTTGAGCAGCCACCCGGCATGCCCCAGGAGCCTG
CCCTATGCTTACCTCAACCTACGCCATCCAGTCCCCAGCGCAATGCACAGGTGGGACATAGACCTTGACAGACTGGTCAGG
ACAGCTCCCTTTAGGCAACAGCAGAGGGGCTTCCAGGGAGGCCCTCACCTTCTCTGCAACCCCAAGCAAGAGGAGGTGCT
GTAGGCAACATCACCGAGCCTGGAAGACACTCAGGAGAAGCCCCCTCAGGCCCTGACACCCAGCTGGGGTCCCACTTGTCTC
CCACTCTGCTCTCCACCCACCCAGCCAGCCCACTGACTTGGCTGCTCAGGAGCGAGGCTCTCGGAGGCTCACAGAGGGAAA
30 GAGGAGCCCCACATGGTACAGGCAGGTACCGAGGAGCTAGTTCCAGAAAGCCTCCACTCGTTCCCTCATGAGCCTACCTGGCTCC
CTGGTATCCAGAGTCTTCAAGAACAGGAGCCCTCGTTGAGAGCTGGCCTGGGAGGCTGAGCTCCTGCTGGGGCTCGGAGTC
TGCTCTCTCTTCTCTCTGTCAGCCTGGGAAGCGGCGGATCTCAGTGTGTCTACTACCCAGGTGGCAGGGGAGAGGATGGGGC
CTGATGGGGAGAGAAAGCAGCCAGGAGGAGGCTTGGGAACCAAGGGGCAAGAGGAGGAGGAGTGGAGGCTGCGCTCACT
GCCCTCTCAGAGAGGTACAGGAGCCATCTGTGCTGGGAGGCTGAGCTCCTTAGGGGGCTCTAATCCCCAGGCTCATT
35 CTGGGGAGGTGGGGTAAACAAGAGTCTGCGTGCTCAGGCTGGGCTCAGGCGCCACCCCACTGAGCCAGGTTTTCCCAAGTA
CCCAATTTGGGTGGGATTTTGTGCAAGGCCAAGTCCAGAGGAGCAAAACAGCTCCTCCCTCCCTCCCTGACCCCAAGCG
CGCTCATTTCCAGAGCTCTTCCCTTTTCCCTCTGAGGTTGGGGGCCCGAGTGCTGGGAGAGCGGGTGGGCGGCGGGCATG
CGTAGCGGAAATCGGATTCCTAAGGTAGTGAGGAGCAAGGGAATTTTTTCAAGAGAAAGGCTGTCTACTCTGAATTACAGACT
CCTGACATAGTACCCAGGTGACCCCTAGGGCCGTGTCCACAGGACCACAGGCTCCCTCTGCAACCGCAGAACCAAGTTGTGAGTG
40 GGGCAGCTGTGGGAGCAGTGCCTCATCAGCCAGCCAGTGCACACACCTGGGAGATCTCAGCCACCCCTCTGAGAGCTG
CACAGAAGCGGCCACATGCCATCCCTGCTCTCATGCACTCCCTCCCGCACTCTGAGCCGACAGGAGGCTTAGCCACAG
GCTGGGAGTGAGTATCCCAAGAGAACACACCGATGAGTCTGGAGTTGCTTGGAGCTCTCAGAAGCTCCCGAGGCTCCTTC
CTCAATTCGAACCGGTAAACCAAGATTCCTGTGAGCTTAGTGCAGTGTGATGACAGGAGGAGCAGCGCATGCGGAGTGCC
TCTTAACATCCAGTTATCAGTCCCCCGGGGAGGCTGGGAGCACTTCCCTCTGCAAAATCAATCTCCCGAGGGGCTCCCG
45 GGGCAACACATGGATATGCAATGACTGGGAGCTGGAGAGTTGACTGGTCACTGGGTGACCTTGGGCAAGTCACTTTCCCTCTCAG
GTCTTCCCTCTCCATCAGCAAACTCCTAAGCTTAACTAAACAGTCAAGAAATCCCTCTGTCGGAACAGGCTCATAGCTTGAG
AGACCTGGAGGTTGGTGGTCCAGAACCTGGGGGAGCACTGCGCTTCCCAACCGTCCCATCGCTCAGGGGCTTCACTGTTCTC
TTCCCTGGTGGAGTGATGGGAGAAAAATGGAGGGTCAATCCCTGCGCCACAGAGAGAGTCCCACTCGTCCCGAGCTGTGACCCA
50 CAGACGCTGCTGACCTTGGAGGCTCACTTGGCGCTTCCCTATTCAGAGGCTGACCCATCCCGGAGCTTCTATCCGCGCA
AGGCGCAGGCACTCTGGTCTCAGCGGAAGGAGTCCGGCCGAGGAGCAGCGGGGCCAAAGGAGCTGCACCCGACACCGTCCGCTC
CCTCCCCAAACCCCGCCCGGAGAGGTTGATGGATGAAGGGGAGCCCTAGCCAGCCACCTCGGGGGCAAGAGACGGAGCTCGCC
ACAGACAGGAGCGAGAGGGGAGTCCGGTCCACCGTGAGCGCAGGCGCGCGGGCTGGAACCCAGGACCGCGCCCGGAGC
TCCAGGAGGCGCCCTCGGATCGCGCGGCCCGGGCGCGCTGCCATCTGGCGCACCCAGCGCGCGCGCACACTGGGGG
55 CCCGCACACAGCAGCTCTCAGACACACCGACACCGCAGCAGGCGGGGGCAACGCCCGCGCGCGGTTCCGGCTCCCGTG
GCCCGCCTGCCCTGCTGCCCGCCCGGGCCCGGCCCG
CGCCAGGAGGGCCAGCAGCGCGCGCGCGCGCTCCAGGGCCCGGCCCGCCCGCGCGCTCAGCTCTCGGGGCGGACTCCCGG
CCCTCCGCGCTCTCGCGCGCGATGGCCCACTCGGATCTTCTTACTCTCTGAGCCTGAAGCAGGCTCTGGGAGCTACCC
GATCTGGTGGTGAGTGAGCTCTCTGCGTTGCGCCCTGCCCCCTGTGCGCGCGCGCCCGCAGCAGAGGTCCTCCCGGAGGAGCC
60 CGCGGTGGCCGAGCCCGCGCTTCTGCTCCAGCCCGCGTGCGGGCGCGCGGGCGGTGGTTTTCTTGAGCGCCACTTTGGACC
TGTTAGGCGCGCTGGGACCGTGGTGGCGAGTTTCCGAGACATTGATCCCGAGCGGGGAGTAGGGAGGTTGCGGAGGTC
TGCTGACATATCTCTGGGAGGCGAGCAGTGGGCTGGGAGAGGCTGAAAGAAGGTCGGCACGCACTGCTCCCGAGGGGACAG
GCAGCTCGAGGCGAGGGACAGGCGAGGGAAGGGCCAGCGAGAGAGAAATCGCCGAGACTTCTCTAAAAACCGTATCTTACA
65 CACAAACACACACACGTTTTAAAAACAAGTCGATGAGACAAGACTGAACAGCTCGGAGCAGCGTGGTTACGTAAAGAAAGCTGG
GACCCGCGGGGAGTGGCGCAGAGCCGCGCGCGGGCGCTGGGGCCCGCGCTGGGGCCCGCGCGCTCCCGCGCAGCTCCCG
GCACGGGGTTTCCAGGGGCCCTCTCTGCGAGCCCTCCGATGGGTCCACCTGGCAATGAGGGGCTGCTGTAGAGAGAGTTAAGGG
TGAGTTAAGCAGGGGTGTGAGGGGCTCCAGGACCTCAATCAGAAAGCGCTGTGCTGCGCCCTCCACACAGAAAGGGCGGTT
70 CGTGAGACCTCCCGAGCTGGCGATGGAAGTGAGATAAACCAAGGAAGGTCCTCCTCAGGCTCCACCTCC
ACTGCACATATCTCTGGGAGGGGAACCGTGGCCACACTTTCGCCAGGGCTGTGATCCCTCAGAGCCCTCACCAGCAAGGATC
ACCCAGTTCCGAATTAAGGGCGCTCTGAGATGCCCAAGATTGAGGAACACAAGTGGGAGGAATGTGGGCGCGAGGCGCGGGCGC
AGCGCTGGTAGGACCCACAGTTGGAGAGAAGCTCCCAAGCATGCACACTCCCCCATCTTCTCCGACGGCAGCCTGGAAT
TATAATAATTACGCCAGGGGAAGGGGAGACCCAGGAGCGAGGTACATTAATCCGATAATAATTTTCTCTCGAGATGTT
75 TCAGGAGCGGGGCTCCCGGCTAGGGGCGCGGGCAGGAGCAGCGGGAGGGGAAGGGGAGCCCTAGGCAGCTGAAGGGCCTG
GAAGAGGCCACAGAGGCGCGGGGACGCTTCCGGGACCCCGCGCGCCCCATTTCGCGTGCCCCATTCCCTGCGGCACCTG
CTGCGCCAGTGGCCCACTGAGGCTCAGGCTCGGGGCTCGCTTGGGGTGGGGGATGACTGACGCGCTCCAGACGGCGCGAGG

489

TTTGTGTTTTCTAAGGATAGAAACAGTTTGTGTTCTGTTTTGAAAACCTACTAAGCATCATCTCCATTTCTGGGGCCTTCTGGATG
ATCACAGATGGTTCCACTAGGTCTTGTGGTGTGGTACTGCGATCTGCTAGCCAGCCCTGCCGTTCCCTCCAGAGCTGGGATTTC
CAGGGAAGGGGAGAGAGCAAGAGAGGCTGGAGATATTGGAAGAGCAGGGTCACATTCCCTTGGGACACCAATTTTGCACAGCCAG
AGGGATATCTGGTGTCCCATCCAGTTGGGCAGTTAGAATTCAGCCACTCAGCTGTGTGGCAGCTGGACGTGGGAACATGGACTC
5 TTTCTGGGACGCTGTGGTGTGGTGTGGCAGTGAAGGGGAGAGGAATGAATTCCTCATCCGGTGAATCACAGGCTGGGGTGCAGGCA
TGGGGGAGGGGAGGGCAGGCTGGCCTCAGCCTCTCCCGGGGAGCTGGGCCAGCCCTCTGCCCCCTGCTGTTCCACACCCCTGAG
GCAGGGCCAGACCTCACTGTGATCCAGATCGTTGGCATCCAGGAAGTGAAGTAGGGAGTGAACGATGGCAAGACCACCCCGCCG
CTCCCCCCCCCGCCGCGCCCAAGTGCTTACCTGTGGTTCCTTGTGTGAGTGATCCTCAGCAAGGACCTTCGTCTTGGACAGA
CACTGTGTTGTCATGCCTACAAAGCGTGGGAGAGGTGCAAGGGGAGATTGGAGAATTCATCAGAAGCCCCAGAAGCCCAAGTGGGAG
10 CTCTGCCCCCTGCTGCTGGCTGGGCGCCAGCTTGTCTTAGGGCACCAGGCAGGACAGTGGCCAAATCGTGGCTGCTCCGCTGAGG
CCATGAGCAGGCAGGAGCCACGGAAGTGAACAGCCAGTCTCAGGGTCTGTCTGTGCCCGTCACTCTGGGCAACCGATGTTGCCCC
TTTCTGTCCCCCGCATGTGCTTTAAGCGCTGCTACTACCTGTCTTTTGGGGATCCTACTGACTAGAGGGTGGAGGTAGGTCCC
TGACCCCCCAGGGTGATTATCAGCAAGGCTGACTCCCCAGGGACTCAACCAAGGGAGCCCCAAGGACCTCAGAGTCTCTATGA
AGACAGACAGGGGCTGGAGCAAGTTAGACTCAAGGAAGCCATAGAAGTTTCCCGTCAGCCTTAGAATGTCCAAGGTAGAGGC
15 AGCCTGGGTGAACCCAGCACATTCCTGTGGCACTCAGCTCCTGGGGCCACCTGGGAGGACCTGTTCTAAACCACAATGTC
CCAGTTCAGTTGGGGAACCTGAGGTTCCAAACAGTCCCAAGCTCAGGTGCAACTGTTAGGGCCACACCCATGTCCCCCTGGGTG
GCCTCCTGGGTGGAAGGGGGCTGCATTGGGACAGGAAGCCCTATGATGTCTTGGGTCTCAGCTGCAAGGAGGTCTGTCAGGG
TCTGTGACTGTCGCCATTATCTCTGACTCATTTATAAATGTTATTTTGCAGGAGTGGGGTTTCATACGTGTAATTTGTCATT
20 CTGCATTGCTATAAAGGAATGCTGAGACTGGAAGAAAAAGGTTTAAATGGCTTAGGGTTCTGAGGCTGTACAAGCATGGCAC
CGGCATCTGCTGAGGCTCAGGAGCTTCCACTCATGGTGAAGTCAAAGGGAGGTACGTGTGTACACCGGGAGAGGGGCGCAG
GGGAGGGTGGCCAGGCTCCTCTAAACCAACAGCTCCTGCATGAATCAGAGGAGAACTCCCTCATTACCGCAGGAGGGCACTGTG
CCATTACAGAGTATCTGCGTCTGAGACCTAAATGGGTGGGGCCCACTAGGCCCCACCTCCAACACTGGGGGTGCAATTTCAACAT
GAGATTGGAGGGGACACATCCAACTATATCAACACATTTGAAGGGCATTGTAGGATCTTAGAAGCAGTGGCCCTCGGAGGC
25 CAACATGCGGGAAGCCCTGTTCTGCTGATTAGCCGTGGCTGTGGCAAGCTCCATTCCCTGAGCCTTGGCTTCTGCTGCGGA
GGTCCAGTGCCACCTATCCAGTCTGTGGGTTTCAGGAGGCCACATACTAGAGCCCGTGGGGAGGTACCAAGTGAAGTCTGCC
CAGCAGGTGGAGCCAGGTAAGGGGCTGGGTGGTGGTGAAGAGGAGCGATGCTGGGTATTGGAAGGGAGAAACACAGCTTCA
GCAAGCTCTCCCTTCAGAGACAAGAGTGTCTGGAAGGTGGAGGCGCCAGGAGGAGGGAAGAGGAGGAGGCTCTCTAAAGAC
CACAGTGGCCAGGCGCGGTGGCTCACACCTGTAATCTCAGCATTTTGAAGGCCGAGGCGGGAGGATGGCTTGAGTCCAGGAGTTC
AAGACAGCAGCTGGGCAACATAGACAGACCATCTCTACAAAAAATACAAAAGTTAACCGGGCATCATGACACAGGCTGTGGTTC
30 CAACTACTTGGGAGGCTGAGGCTAAGATGGGAGGATCCCTTGAGCCCTGTAGGTCAACGCTGCAGTGAAGCCCTCAGCTAGACGAC
AGAGCAAGACTTCATCTCTAAAAAGTAAATTAATAAAATTAACAAATAATAAAGGCCATGGCAGTGGGCTGGCGGAGACAGCGG
TGGCTCGGGCCCTGGAGCTTGCATAGCAAGATGCTGGAGGTGGCAGCTGGCCCTCAGATCCTTCTCTCTCTCTGGGTCTGAGAA
GCTTAGGTGTTGAACTCAGAGTGGTCAAGAAATGCCAGATGAGCAGGAAAGTGAAGGGAGATATCTGGCTGGCTCCAGTCTG
35 CAAGACCTATCTCTACAAAAAATACAAAAGCAAGACAGCAGGGGGCTTGGCATTGGCTAACGACAGTGAACCTCCCGAGTT
TGGGATGAACATCCTTTTACGTTCCAAAGTGGGATCCGGGATCCAGGTTGCATTGTATTGTATGACCCCTGAGAACTTGGCT
GAGAAGCAGGACCTGGGACACTCGATCTCGAAGACGGGTGTTCTCATTCTCTCATTTCAGAGCCCCCTCCCCACTCACTGCA
GCCAATACTCCCTGGCGAGACCTGAGACAGGCTGTCTGTCTTGTCCAGGCAAGCTGGCCACAGGGTGGGGAGGAGGAA
40 GTTACAGGTATAGTTTCCAAAGCACTGATGATTCCGGGATCTGCATTCTCCTTGGATTAGAAATTTGGATCCTAGGAGCTTT
GGGGGCTGGTGGGGATAGTGCTGTGCAATTTAGATTTTTTTTTTTTGGAGACAGGCTCTCACTCTGTACCCAGCCTGGTGT
ATCAGAGTCACTCTGGGCTTGTCTCTGGGCTCAAGTGAATCTCCCACTCAGCCTCCCAAGCAGCGGGATCAGGTTGTGTG
CCACCACCCAGCTAACCTTTGTATTTTGTAGAGATGGGTCTGTCTGTGTCAGATGGTCTTGAATCCTGGCTCAAG
CAATCCACTGCTCAGCCTTCCAAAGTGTCTGAGATTACAGGCATGAGCCACCATGCCAGCCTTATATTGATTTTCTTTTAAAT
45 GACCAACTGATCTCTCAAGGCCAGCCAAATCTGGTGCCCAAGTGAAGCTCCAGGCGCTCTCTGCTGCTCCCTGGCCCA
CAGGAGCTCCCCGCTGCTGCCAGCTTTCCACCCTCTCAGGAGGGTCTGTGTGGCCAGGCTCTGTGTGGCTGGTGTATCA
GAAGGAGAAATCTCTCAGGAAGCAATCAACGAAGTGGAGGGGCTCTGTGCCAGGAGGAGGAGAGAGCCCTCTGACCCCA
AATCCACAGGGCCGCTCAAGGAGGGGCTCCCTGGGCTGTGAGAGGCCAGGATGCTGGAGCCACCTCTGGCTGAGCTGG
CCACTGCACCTTGGCCATACTCAGGAAGTGGTGGGCCAGGCCCCCGGAGGAGGGTGAAGGGGACAGAACTGGCTGACT
CAGCACCCTGAGAAATGGAGGCTTCAAGTGGGAGTCCACCTCTCTGCTTTATCTAGAGACAGGGACAAGGCCGCCCTCCAGC
50 CCCAGGCTGCGAGCTGAGGTGGTCCCGCTCCATGCTGGTCACTAGTGTCTGGGGGTGGGACAGTGAACGCCCAAAATGAAT
CCAGACTTAGCCTCGGAGAGGGATGAGCCTTGGAAATGGCCGATCCCCAGGCCAGTCCCTGTTTGTAGCAGCAAGCTCTA
AGTGGATTCTTTGTTCTCTCTCATTCTAAGTCTCCAAGTAAAAAGGACATTCACTACTCTTGTCTTCTCTCTCAGACCT
CTTGCTCACTTCCCTGGCTGAAGTAGGCTGGCCCTGGAGCCTGGGTACCCGGCCCTTCTCAGACACACTCCAGGCTCAGCA
TGACATAAGTGTGTTGCTCTACAACTTCCATTAGGAAATTTCAAACTATGGAAGAGATGACGCTTGTGATTAAGCTA
55 CTGTGTGTCCAGCTCAGCTGAAGTCAAGCTGCTTTATCTCACCCACCACTCTCATTCTCTATCTATCTCTCTATCT
TTTTATGCTTACGTGAGTCTGCTCTGTCCCAATACTGTAGCAGGCAGTCTGAACAGTGTGATGTTTGTGAAGTAACATCC
CACATGGAGTCAACCATAGAATGGGTGAAGGGGAAGCATCTGGGTTATGGAATGGAGGCACCTCAGCTGGGGCAACCACTCAC
CCTGGCTTAAAAATGAAGCCCTTGCCTGGGCAGGTGGCTCATGCCATATAATCCAGCACTTGGGAGGCCAAGGCAGGTGGAT
CAGCTGAGGTGAGGAGTTTGAAGCAGCCTGGCCAAATGGCAAAACCCGCTACTAAAAATAAACAATTAGCCAGGCATGGTG
60 GTGCACACTGTAACCTCAGCTACTCGGAGGGTGAAGGCAGGAGAAATCGCTTGAAGCAAGAGGGGAGGTTGCAAGTGAAGT
CACACCACTGCACTCCAGCCTGGGCAACAGAGCGAGACTCCGTCTCAAAACAAACAAAAAGGAAGCCCTGCACTCTGGGCGAA
GCAGACAGTGTGCTCCCGGCTCACCATGGGCACCCAGGCCCTCTGCTGGCGTTCCTGGGTGCTGTGAGGTGATGGTTG
AAAACACAGTCCAGCCCTACGGTCACTCCCTGGCTGGTTCAACCCACCTCTCTGTCAGAGGCTCTCACCCACAGTCC
AGGTCAAGACAGCTGACCTTGGTCAACCACTTGGCCCTGGGAGTGGCAGTGCAGACCATACCCAGGAGCCCGGATGGTCA
TCCAGTTGCGGGACTCAAAGGAAGAGAGGATGAGGAAGGAGACATGGAAGAAAGACTACCCAGTACCTACAGCAGGAACACCA
65 ACCAGGCTGCATCAGCACTTCTGGAAGTCTGGGATCTACAAATGGTGGAGGGGTGTGAGGACACTGGGGGTGAGGCTTGA
TGGCTGAGTGAATGAATAAAGAGTGAACAGGGAGCCGACTGTGCAAGGACAGACTGAGGGGTGAGGCTTGAAGTGGTGGCT
GGGATGACAGTGGGTCTGGCGGAGGTTATGCACTCAATGAGGGAAGACAGGAGGAGGGTGAAGGAGAGGGGAGGCGAG
ATCTCCAGGGGTAGACATATTGGGACCTGAACACTGGGAGTCCGGTCCGGAGGCCAGACTGGTGGATCCAGTGGACATCG
ACAGTGGTCTAAGCATAGGAATGGGTAAGGAGGAGTCTCTCCCTCCACCCCTCCACCACTGCCCCAAAGGACCTGGTGAATTT
70 GTGATTTTGTACAGCAAAATGAAGACCTAAGTGCATGGCTCAATCGTTCTGAGCTGAAGCACTCATAACCAACATCGCAG
TCAACCGCAGAGCACTTCCGCCAGGCTGGCTGGCAGAGCTTCCCTGATGACAGGCACATTCCCTATCTAAGTGTCCATTAGG
TAGCAGCGGGCCACAGTGAAGCATGGCTGGTGCACCGAAGGGCTGAGTTTACATTTCTGCAATTTAATTAATTAATTA
ATTACATTAATTTAAACGGCACAGGTGTGAATGCCCTTTGCCAAAGCAGAGCACAGCTGGGAGCTGTGGGACCTGGAAGCG
75 AGGAGTGAAGTTCCCAAGTGTCTCTCCCGGATGAGTGTGCTGTGCTTGTGAGCTCAGACTGGGGATGCGGAGGGCCCC
AGGAGCATCTCAGATTGAGCCCTCTCCCCAGTGTCTCAGGGAGCCATGCTTGGGTTCTGAGCAGCTGGCACCTAGAA

491

5 TCCCCAGCACCAATTATTAAGTAGGGTGACCTTTTCCAATTATGTTTTGTTTTCTTTGTCAAAGATCAGTTGTCTGTACATTT
TTGGCTTTATTTCTGGGTTCTCTATTCTGTTCCATTGGTCTATGTGCTTACTTTTCATACAAGTTCCATGCTGTTTTGGTCACTATA
GCCTTGTAGTATAATTTGAAGTTTGTCTTCAAATTAGTATAGTAGTATAATTAGTAGTATAATTTGTTTTGCTTAGGATTGCTTTG
GCTATTTGGGATCTTTTTGGTTACATATAATTTTTTTTTTTTTTTTTTTTGTATGGAGTCTCACTCTGTGTGCTAGGCTGGAGTA
10 CAGTGGAGTGATCTCGGCTCACTGCAACCTCTGCTCCAGGTTCAAGGCTATCTCTGGATTCCCTGCTCAGCCTCCCAAGTAAC
TGGGATTACAGGCATGTGCCACAATACCTGGCTAATTTTTTTTGTGTGTGTTTTGTTTTGTTTTGTTTTTAATAGAGACGGAGTTT
TGCCATTTTGTAGTCAAGGCTGGTCTCAAACCTCTGACCTCAAGTGATCCACCCACCTTGGCCTCTCAAAGTGCTGGGATTACAGGCTT
AAGCAACCCACACTGGCTAGTTCCGTATAAATTTTAGGATTGTTTTTCTTAATCTGTGAAAAATGATGTTGGCATTTTGGAGGGA
15 ATTGCTTGAAGCTGTAGATTGCTTTGGGCGATTTGTCTATGTTTCACAATATTGATTTTTACTGTCCATGAGCATGGGATGTGTTTT
CTGTTTGTGTTGTGTAGTCTATGATTTTCTTCAAGCGGGTGGCTGCAAGTTTTTCAAAATGCGCTTTATCCAGTTGCCCCAGGTG
CAGTGGCTTTATTTAACTTTCAAGGTTTTCAAAGACCACCTTCAATTAGCCACTGCTCTCTCTGAGACAGTTCTGAGTTAGGC
AAAAACGAGTTTTTTTTTACCAGACAGGTTAAAAACAGACAAACAAATCTCTGGGAAAAGGTCTGCTCCGCTCCCTCCAGAACTA
TCCACCCACCTGGGGAACGCCGGCCTTCACTGTCCAGGCGAGTTTGTAGGCACCCACATGAAAACTACAGGCTCTCTCTAG
CAAGTCAAGGTCACTATTCTCAAGTTGGCATTCACTGGGTTGCGGTGACCTTTGACTACTTTCCAGAGAGCTAACAAATGTGCG
20 TACTAACCGTTTGTGTCTAATTTTTTGGAGGGCCCTTGGAGCTTCTTTTGGGTTCCAGGCTGCGTTCTGGGGTAGAGGACACAGA
TCCACCACTCGATGGAGCATCAAGGTCACTTGGGAGACCCACATGTAGGGCGAAATGTGCATAGTACCATCCACCCAGGGTGG
CTCAGCACAGTCTGCGCGCAGAGCGGGGCCAGGGAACACAGCTGTGCTGAGCATGTGGTCAGCAGGCGGAGAGATTGGA
GACATGGTGGCGGAAGGAGGCTACTCAGACAAAGCAGACAGGTCAAGCTGGGAAAGTCTCTCCAGGACCTTGCAGTCTGGGG
GTCCTGTGGCAGAAATGCCAAGGCCAGAGTTCTCACTTCTCCACAAATCTGCTTCCCCGCTGTCTCCCTCATTTTATAACGG
25 ACAACCCAGTTCTCTGTGCTTAGGTCAAAAACCTGGGCCCCCTGGCTGCCACCTTACCCTCTCTCTGCTCTCCCGCAATAGT
ATGAATGCTTGTGGCCACCCCCCCCCCAATCTCATATTGAAATCTCACCACAGGTGACGGTGTAGAAGGTGGGGCTTTGGG
AGGTGGTCAGGTCAAGGATAAAGCCTCATGAGTGGGATCAGTGCCACTGAGGCTGAGGTGGGAGGATTGCTTGAAGCCAGGAGT
TCAAGACAGCCTGGGAAACATAGCAAGACCCCATCTCTGCAAAAAATAAGTTAACATATATTAGCAAGCACAGTGCCTTGTAGT
CCTAGCTACTCAGGAAGTGTCACTTGAAGTCCAGGTTGAGGCTCAAGTGAAGCATGAGTGGCACCCTGAGCTCCAGCTTGGGCAACA
30 GAATGAGACCTGTCTCTAAAAAATAAAAAATAAAAAATAAATAGGCCAGGCGTGGTGGCTCACGCCTGAAATCCAGCACTTTG
GGAGGCGGAGGCGGGCAGATCACTTGAAGTCAAGGATTCGAGACAGCCTGGCTAACATGTTGAACCTGCTCTACTAAAAATAC
AAAAAATTAGCCAAAGGGGGTGTGGGCATCTGTAATCCAGTGTGAGGCTGAGGACGAGAACTCACTGAACTGGGAG
CGGAGGTTTTAGTGAGCCGAGATCGCTTCACTGTACTCCAGCCTGGGCAACAGAGTGAGACTCCATCTCAAAAAAATAAAGGA
35 AAAATATAAATAAATAAACAATAAATAAATAAATAAAGGAACCTCTCAGTCTTCCACCATGATATGCTGACCCAGGAGGAAA
AAGAGGTCTGACCCAGTGAGAAAGAGAGGTCTATGAACAGGATGTGTCCTCGCGGGCACTGAACTCCGAGTGCCTTGCCCTTG
GACTTGTGCTGTTTATGAGCTGCTGGCTATGTTGTTTTTATAGAGAGCCACAGGACTGAGACACTCTCTGTGCTTCCAGCC
CCACTGGCTCTTGGCTGCTCTCAAACTAGAGCATGATGCCCTCCCTCCACCTTTGCACTTTGCACTGCTCTGCGCAGGAA
CACCTTTCTCTGTAGTAATCCCAAGGCCCTCTCAGGAGTGTCCCCACGCTTGTCTCTATCCCCCAACCTGCTTCAAGCC
40 TCTGGTCAGCCCCATGAGCTGATGATTTCTGTGGAAGGACAGATGGCTTGTCTCAGCCCTGCGAGCAATGCGAAGGAAGACCAC
AAGTCTTTTGGAGGGAGGTGCTGCGCTGGCCCTGGGGGCTGGCATGTGCACTGACAGGAGAGCTCTGAGTGTGCACTGACACTG
CTCCAGGGCTGGTGGGCTGGCTGAGGCCATCCATGGGCGAGGACCTCCAGCATCCAGTGGCCATGGCCACGCCCCAGCCTC
ATCACGGCCCTGTGTTCTTCAAGCGTGGGGAAGGCACCTGGGGCAGAGAGTGGGGAACCGAGGCTCAGAGTCCGGGCAC
TGGTCACTGTGGGTCTGGATGAGGAGGAGCTCCCTGAAGGACAAGTCAAGGTCCCTGTAGGAGAAGAACTGGAGCTTGGGGAGC
45 TTGATGTTGGCTTCTCTGTGATCTTGAAGTGAAGGAGGAGTCACTTCTGAGGATCAGCCTCCCATTTATAAAGTGAAGAATAC
TTCAGCTTGTGAGACCTCACAGAGCTGCTGGCTGGGGTAAATACACACAGCAGTCCCTGGAGATAGCTCCAGGCTGACAGGA
GTCAGGTCCAGGGCCGTGCACTCATGAGCGGTGTCAGGGGTGTGTGCGGTGTGATGCACTGTGTATGTGAGTGTGCACTG
TGTGTGGGAATGTGGTGTGATGTGTGATGTGTGCACTGATGTGGTGTGTGGGTGTGTGCTGTGATGTGTGTGATGTGTAT
50 GTGTGAGTGTAGTGAATGTGTATGTGTTTGGTGGATACATGTGCTGTGATGAGTGTGCTGTGCTGTGCTGTGCTGTGCA
TGTGGCTGTGGCATGCACTGTGATGCTATGTGTGATGTGATGCACTGTGCTGCCCTAGGGTTCTGGGCTGTGCTGTAGCCAG
TGGTGGCATGAGGGAGGAGTGGGCAACATATACCTGCAAAAGGCCAAGAGCACCAGATGGGCTCTGTCATGTGCTGTGCTG
CTCAGAGCCAGGATGGGCTGCTAGGCTGCCACTCCCCCTCTGAGAAGGAAGCAGGATTTTGAAGGAAGCAGGAAGCCTGT
CCTGCTGGAGCCATACAGGTGATGAGGAGGAGGCTGTGCTGATGGGTGAGAGGGAACATGCCATCCCTAAAGCCCTGCTAC
55 CCTGGGGAATCTTTAGGATATTTCACTGCTCCAGAAATGTGAGGCTGTCTCACTTGTGGAAGCAGGAGGACATCTCACTTGC
CAAGCGGGGAGGGCTCTGCCATGGAGCGCATCAGTCACTGACTCCCAACCTGGGCTGAGCCCATGAGCCGAGGAGG
AAGTATGCTCATGAGTCAACCATTCAGGAACCTTGGGTCTGTCTTCAAGCTGAGCCTTGGGGAGCCTGTGATCACTGTCTG
GATTGGACGATGCCATGGAAGGCACAGATCTGCAAGATGGGAATCCAGCCAGCAGATTGGCTGGGGGCCAGCCAGCTGAAT
60 GCAAAGCCCCAAGTCCGTGAATAGCACTGGGCTCTAAACCTGATGGCACTCCAGCTGCTCAAGGAAGGCCTATGAACGAGTC
CTGCTCTGGAGTCCCAAACTATGCTTAGGAGCTGTGCTATATACAGAACTCTCTCCCTTTTATGCTGAGTAAATTTCCAT
TGATGATGATAGCATATTTGTTTATCATTCACTCACTGATAGGCAATTTGGGTTTTTCAATTTCTTGACTATTATAAATAATG
CCTTTTGTGTGAATGTGATTTTCACTTCTCTGTCATATACCTAGGAGCAGAAATGGGTCAAGAGGAACCTCATGCTTAACTT
75 TTTGAGGAATGTCAAACCTATCCAGAGTGTCTGCACCAATTTTACATTCATCAGCAGGATCTGAGGATCTGATTTCTGCACAT
CTTCATGAGCACTTGTGATTTTCTGCTGTGTTTTTGTCTAGCCATCTAGTGGGTGTGAAGCAATGTCTCACTGAGGTTTTCA
TTTGATTTCCCTGATATCTAAGGATGTTGAGCATTTTTCATGTGCTCATTGGCCATTGCGCTCTCTCTCTTGGAGTAATGTTAT
TCCATTCTTCCACCCACATTTAATTTGGGTTATTTGTTTAAATAAGAGTTTTAGCGTTTTAGTGCTTACATCTCGGTCTTTA
65 TAACCAAGCTCACAAGATCTACTCTTATAGGTTTTTTTTTAAATAAGAGTTTTAGCGTTTTAGTGCTTACATCTCGGTCTTTA
ATTTTCATCGACGATGTGAGGAGGGATCCAATCACATTTCTTTCATGTGGAAATCCAGTTATTCAGCACAATCTGTGTCAGAC
TGTTCTTTCCCTTTGAATAGTCTTGGCACTTTACTGCAAACTAGTTAGCCCTAGATGTATGAATTTATCTCTGTGCTCTTTATT
CTATTCCATTGTTCCATATGTCTGTCTTTATGCCAGTGCCACACTGTTTGTATTATGTAGTTTGTAGTGTTTGAAATTAGAAC
70 ATGTGAGTCTCTCTGCTGCTCTTTCTTCAAGGTTATTTGGCTATTGAGGACAATTACAGTTCATGTGAGTTTGTAGTTTATTAATCTC
ATTTTAAATTATTTGCTACTAGTGTATAGAACACAATGAGGCCAGGTGCACTGCTTATGCTGTAATCCAGCACTTTGGGA
GGCCAGACAGGAGATCAATTTGAGGTGAGGGTTCAAGAACACCTGGCCACATGACAAAACCTGTCTCTACTAAAAATACAA
AAATTAGCCAGGATGGTGGCAGTCCCTGAGTCACTAGGAGCTGAGGAAACAGAACTCAATTAAGCCAGGAGGCGG
AGGTTGAATGAGCTGAGATCACACCACTCACTCCAGCCTGGGCAACAGAGTGAGACTCTGTCTCAAAAAACACACACATAC
GCACACACACATACACACAAATGATTTTAAATATAGATCTTGTACTCTGTAACCTTGTGGAGTTGTGTGATCAGTTCTAATGTA
75 TTTTTAATTTGAGATTCATTAGGCTTCTACGTATAAGATAGTTTTATTTCTCTTCCAATCTGGATGCACTTTTTCAATT

493

494

5 AAAGCCATAGCCTCAAATACCTTCCACTTTGTATGTTCTTGTTATGGGAGCAACGTGCGTTCTTCTGTGCTGGCTGTGTGGATG
TGTGTTGGGCGGTGGGAGCGTCTGAGTGTGTGCACACTCACTCGTGCCCTTCTGTCCCAGCTGGCCTGGGCTCAAGGGCATCAC
GAGCCCCAGGGGTGCTGTCTCGGTCTCTCCTAGGCAGCTGCAACACATGCTGTGTCCTGAGTTAGGCCATTCTTGCAATTG
10 CTATAAGAAACACTTGAGGCTGGTAATTTATAAGAAAGATGTTAATTGGCTCAGGGTCTGCAGGCTGCACAGGAAGTGTGGC
TCTTGCTTCTGCTTCTAGGGAGGCTAGGAAGCTTCAATCATGGCGGAAGGCAAGGGGAGCAGGCATGTCTATGTGGCGAGAGCA
GGAGCGGGATAAAGAGTGGGGAGAGGTGCCACACACTTTAAACAACAGATCTTGCAAGAACTCACTCATATCTCGAGGACA
GCACCAAGCCATGGGACCCACCCCATGACCAGTCACTCTACAGGCCCCACCCAGCCCTGGAGATCACAGTTCAACATGAG
15 ATCTAGGCAGGGTTAAATATCCAGACTACATCAGCCCCATCCACCCGAGGATGAAGCTCCCTGGATGTCCAGGTGGCAGAGGAG
TCACAGCCCCATATGATGACTCTGTGTGACCCTAAGGGTCCATTGCAGGCCTCTGCCAAGGAGGAGCAGGGGACACTGTGGGAC
GTAGCCCTGTATCCCCGCTTGTCCCATGGGAGGACCTGGCTCCAGGAGAACCTCAGGCCTCTTCTATCCCCATAGAGAGGGCC
CATCGAGCTCCCTTCTCCCTCTGCTCTCCAGGGCTCGAGGGGAGAGAGAAGGTGAGAGCAAGGAAGGTGGAGGCTCAGGA
CTCTCCCAACAGAGCAGAGACATGGAGGAACCTGCCAGGGCACACTAGCCCCAGAGGCAAGCCGAGGCTCAGGGGCTC
CAAGCCCAAGGTGTCTTCTGTAGGTCTGTAAGATCCCTGCCAGCAGCAGGTGAGGCTCTTCTCTGTTGGCTCCCTGCTAGTT
20 CCCCAGCTCAGACTGCAATGCTTGGCAACAGCAGGCACTCTGTCTCACTGCTGTGAGTGTGGGTCCAAAGTGTGGCTGTG
CTCTTTTATTTTGTGTTTTTTGAGACAGGTTCTCACTCTGTGTGCCAGGCTGGAGTGCAGTGGTGTAACTCATACCTCACTGCAGCC
TTGAACCTCTGAACCTCAAGTGTCTTCTGCTCAGCTCTGAGTAGCTGGGATTATAGGCCCCAGCCCTGAGTGTCTTTATC
AATGGAAGCAGGGCTGGCCAGGCCACCCCTCTCTCATGCCCTTGCAGAAGTGTCTGCATACACCCACCCCAAGACACAGCT
CATCTCTTCAACCTGTCTGGGAAGCCTGGCTGGGTCTGGCTCTGCAAGGCCACACCCAGCTCATCTCCATCCCTCTGATC
CTAGCCTCCAGAGCTTCTCTAAATTCAGCCCTCCCTACCACCTTCTGCACAAGCAATGCCACTTCCCCAATTGGCCTCTA
25 TTTCCCATTTGGGAAGAAGGAGCTGTGTACAAGGACCCAGGCAGCTCCAATGTCAGCAGCGGAGACACCTGCGAGCTTCCA
AGCTGGAGGCGAGGGCATTTGGGGCACTGGGGCTGGCCCTGGGGAGGCGGGCACTGGAAGTCACTGGTGTGAGAAGATTCCAGAA
GAGGCAGCTGTACCGCTGAGCCATGCAAGTGTGCGTCTGGGGTGGAGGAAGGCAATGGCAAGTGGCAGCAGAGGTGGGCGGT
GTGTGGGGTGGAGCCACACTCTGGGGTCTGCACCCAGGCTATCTGGGCAGCAGAAGGAATTAGCTCTTGTCTGGTTTTACCTGCC
TTGCTTCAGTTGTATGATTATTTGAGATCCTTTGTGCTATTTTCTGTTATTCCTAAATTAATGCTGTTCAGACTTGCACAT
30 GCTTTTTAACCATCCCTGTTAATGGACATTGGGGTACTTCCAGTTTGTGGCTGTGTGAACATTGCTTACAAGTCTTTGCACAGA
CAGGGTTTCTCTGGGGCAACCTAACGGCTGGTGGAGCTTTACCTTGAAGACACTGCCAAGTGCCTCCCAAGGGGATGAC
CTTTCCCTCTCAGCTCCAGCTGTGAACAAGGGTCAAGGCTCTGTTCTCCACATCTTGGCAACACTTGTACTCTTTGA
TTGCAGCCATCCCGTAGGTGTGAGGCGGCCCTTATTGGGTTTTTGTATTGACATCCCCAGGATGGGTGATGTCGACCATCTT
TCCAGGTGATGCTGGCCTTCTTGTGCTTTTTTTTAAAGACAGGGCTTGTCTATCACCATGCTGGAGTGTGACTATAGCTC
35 ACTGCAGCCTCAAACCTCTGGGCTCTAGCAATCTCCACCTCTCGGCTTCTGATAGCTGGGACTACATGCACACCACTGCACT
TTGCTAATTTTAAACATTTTTTTGTAGAGATGGGGTCTTGTACTATTGCCAAGGCTGGTCTCAAACCTCTGGGCTCAAGCAATCCTC
CCACCTCTGCTCCCAAAGGGCTGGGATTACAGATGTAAGCCACCTTGCACGCTGTATGTTTTTAAAGACAGGGCTGGAGTGCAGT
GGTGTCTATCTGGCTCACTGCAGCCTCACTTCTCTGGCTCAAGTGTCTCTCCGCTCAGCTCCCAAGTAGTTGGGGCACATC
CAGTTAATATTTAGTTTTTGTAGAGATGGGGTCTTGTCTATGTTGAAAAGGCTGTCTGGTCTCAAGCAGTCTCTCTACTGTGCC
40 TCTCAAAGTGTGGGATTACAGGCATGAGCCACTGTACTTAGCCAAAGTGTCTGTTTAAAGAGAGCTGGTACCAACCTCCCTCT
CTCACTTCTGTCAACATGTAATTTCTGCACACACTGGTCCCCCTTACGCCCCCTTCCCTTCTGCCACAAGTGGAAACAGCCTG
AGGCCCTTGCAGAGGCACTGTGCTGAGCCATGCTTCTGTAGCTGTAGATCCGTGAACCAAGTAAGCTCTTGGCTTATACA
CCACCAACCTCAGAGTTCTTTATAACAATGCAATGGGCTAAGACCCCTGACCTGCCAAGGGCGGTCTTTGAGCTGAGCCCT
GTTAACCTCTGATCTCTCTCTCTACAGCTACCAGGGAGTGGCCCTTGTCCAGCCATTGCCTCAGCCGGTGTGGCCTTTGCA
45 GTGACATCTATGTGCAAGGCAAGGCGCCCATCTGTGGCTGCAGCAGCCGCCACAGGGCTCACCAGGCAAGGGCTGGAAGT
GGGTGGCTGTAGCGAGGACATCGAGTTTGGTGGGATGGTGTCTCGGGAGTTCGCCGACGCCCGGAGAACCGGCAGATGCCCGT
CAGCCGTGAACCGCCACAACAACAGGCTGGGCGCCAGGTAGGTTCGCCGCCCGCAAGGGTGTCTGGGAAAAGGAGCCTCTCTC
CAGGGTGTGGCCCTGGTCTTGGGGCATATGGCCCGGTGAGGAGGATGGTGGCCAGGCTGAGGGTCTTCTGACCCCTGCTG
50 GGGTGTGCGAAGCTTAGCACCATCCAGCTACACCACAGCATCCAGTGCCTCTCTGGGATGGCGAGCCACCTGTGGACTGGGTA
GCCAAGAGGAGTGTAGGCAAGGCTTGTCAACAGGAGCCCGGAGAGCCAGGGAGGAGACAGCCAGGACCGACAGAGA
CGGGGAGGAATCTGCAATGAGGAATGCAGGCACACAAGGATGACCCGATGTCAAGGACAGCTGGCAGTATTAGGGGGAGGAG
GCTGGGAGAGCTCCAGGCAGCTGGAGGTGAAGACAACAAGCGACTTGGTGGGAGGACAGAGTGTAAATGGAACAAGAGC
ATCTTGATCTGCAGAGGCCAACCCAAACCAAGCCGTGAAAGCTTCTGAGCTGTGTCTTATTCTGTCTGTGCTGTACACAAA
ATACCTTAGACTGGATAATTTATAACAATGGGAGTTTACTACTACAGTTCTGAGACTGGGAAGTCCAAGTGTACTAGC
55 AGATACCTTGTCCGGTGGGGCTGCTCTCATGGATGCTCTTCTGTGCTCCTACCCAGGGTGTGGATCGCTCTGGGGTTACTT
TTATAAGGGCATTGTTTTAGGCCATTCTTGATTGCTACCCGAGACTGGGTAATTTATGAAGAAAAGAGGTTAATTGGCTCATGG
ATCTGCAGGCTGCACAAGCTTGGTAACAGCATCTGCTCAGCTTCTTGGGAGGCTCAGGGAGATTATACATGGCAGAAGTGGAG
TGGTAGAGCAGGCATGCATGGGCCAGAGCAGGAGCAAGGAAGACAGATGGGGAGGAGGTGCCACGCAGAGATCTTGTGTGAAC
TCACTCATTATCATGAGGACAGCAAGCCATTCTGAGGGATCTGCCCCATAACCCAAACACCTCTACCAAGTCCACGCCCA
60 ACATGGGGATTACACTTCAACATGAAATTTGGAGGGAACACAGATCCAAACCGTATCAGGCACGAATCCATTACAGATGCTCCA
CCCTCATGACTTGACTTGATCACTTCTAAAGGCCCTACCTCTTAATGCTGTACCTTGAGGGTAAAGATTCTTCTGGGGGGT
GGGGACACAGGGTCTTGTGGATACAGTGGCACCATTCTCAGCTCACTGCAGCTCCACGCTCCCGGGTCAAGCGATTCTCTGCT
CAGCCTCTGAGTAGCTGGGACTATAGGCGCATGCCACACACCTGGCTAATTTTTGTATTTTTAGTGGAGATAGGGTTTACCAT
GTTGGCCAGGCTGGTCTTGAGCTTTTGGCCCTCAAGTGATCCACCCACTCTCGGCTCCCAAGTGTGTTGATTACAGGTGTGAGCCA
65 CCATGCCAGCCGAGGGTAAAGATTTTAACCATGAATTTTTAGGAACACAAACATTACAGCACAGCAGCTTGTAGAAAGGAT
GTGGTCAGAAGATCAGTGGATGGCCAAGGGAGGAAGATGGCTGATGGGCAGTGACGGGCGTAAGGACCAAGTGGCGTCCACGGGA
TTTAACAACATGAAGATGGCAGCTGACCTTGGCTGTAGAATCAGGGGACACAGAGGGGTGACGAGTGAACAGGGGATATTCACT
TTTAACAGTGAAGAACTAGATAACTCAGACTAATCTTCTGCAGAAGACAATTCAAGTGCAGGATGAACATAAAAAGCACCTG
TTAAAGTGTGGAGTCCCCATAATTACCAATTCTGATAGATGAGGCAGTGCAGTGCCATGGGAGAAATGGGCTTTTCAATAAAT
70 GGTGCTCAGTCAACCGGGTGGTCTATGGTCTGAATGTGTCTCCCAAAATCGTATGTTGTAAGCTTGTCTCAGTGCAACAGTC
TGGAGAGGTGGGACCTAATAAGAGGTGTTAGGTGATGAGGGCTTGGCTCATAAAGGAGCAATGCTGCTGTAAAAGGGCTTGC
AGAAGAGGGTCTCTCTCTCTCTCTTCTATTACTTCTGCTATAGGACATGATGTTCTCTCTTCTGGAGGACATGGCAT
TCATTACGGGTGCCCTCTTGAAGCAGATAAACAAGCCCTAACCTGTGAGCAGCTTGAATCTTAGATTCCAGCCTCCCAACCA
TGAAAGAAATTTATGAATTACTCAGTCTCAGGTGTTACGTTGTAGCAATACAGCAATTGACTAAGACAGATAGCAACATGAA
75 AAAAATAACCTGGCTTGTACCTCACACCATCTGTAAAATCAATTACAATCCAGTGGGACAGGTAAAACATAAACTTTTA
CAAGAAAATATAGAATATCTTTGTGACCTTAGAGTAGGCAAGGTGTCTTAAACAGTCCAAAAGCACTCACATTGAAAGAGAAG
TGGATAACACTAGACTATATTCAAATTAAGAACTTTCATCCATAAAGAGACACCACTATGGGACTGAAAAGGCAACCATAGAGGA
CACATTACATACATACATCCACTCACATATGCAGCAATGTAGAGAAGCTACAGTAGGAAAAGAACTCTGCAGACTAAGAAAA
AAAAGATAGACAAAACCAATGGGAAAATTTGGCCAAAATTAAGCCATGTTATGAAGAAAATATAGAATTCACCTACCTATAC
AAAAGGTGCTCAATGTTATGAGTCATCAAGAAAATGCTGTGAGAACCTATGCTCGGAAAGAGAGAGGAGATGGGGTGTCTGAG

496

497

498

Table 23

MOUSE NOMENCLATURE
 ICSGNM Ly6e
 Celera mCG2785

HUMAN NOMENCLATURE
 HGNC LY6E
 Celera hCG1765592

MOUSE SEQUENCE - GENOMIC

TCTCACTTCACCTGGGTCTTCTCAGGACAGGGGCTGCTTGGAGAGCTTTGTGAGTGAAGTGGCTCATCCAGTGAGAAAGAAGA
 GACAGCCCTGCTGGGAACACCTAGGAGCGAGCTTAGCAGACTGCAGATAAGGGTTCCTCCACCCTAGAGACACCTCTGACTGT
 GGGAGGCACTTAAGGATTTCTGACTGCACTAATCTTGTCTAGTTTGTGAACCTCGGCAAGGCACAGTGGACCAAACTGAAAAAGC
 AGGTACAGGAATGACTAAGGCTGAGTTGAGAACTCTTCACGGCTAGGACCAGGGCTGCTAGGATCCACAGATGGATGGTTGGCC
 AACTTTTCAGTCACTCTCATGAGATAACATTCTGTCTGGGAAGGTCAAGGGGTTTGTGAGCAAGAAGTAGTACAGGTTGTATCTGT
 CTCAGTCAATGTTCTATTGCTGTGAATAGACACCATGCCACTCTTTACAAAAGAAAGCACTTAATTGGAGCTTGCTTACTGTGTC
 AGGGGTGTTGCTATTATCACCATAGCGAGGAGCAGGCAACACAGGCAAGCAGACAGGACGCTGGGGAAGTAGCGGAGAGTCTGT
 CATCTGGACCCACAGGCAAGCAGGAAGAGAGTGAACCTGGGTCTCGCTTGGACCTTTGATGCCTCAAAGCTCACCCCTCAGTGACA
 CACTCTTTGAACTGAAAGAACTTAGTGGGAAAACCCCACTCAATTTCTGTTCAGTGCACACCAAGAAATACGAACAGACGACCC
 ATCTTGATGTAAAGCATGAGGTAGTTTAAATGACGGAGTCCGGGCGACACATATCTCCCACAGGAGACAGAGGTGTGGACCACA
 TGGTGGAGCCATAATGGCGGAGCTCCGGTTCAAACGATCTCTCACAGGAGACAGTGGTTTCGACCATGAGGCTTGGAGCTAGG
 GGCTTTTATAGAAAAGGGGTAGGGCTGGGGGAGGAATAGCGAGGTTTACATGATTGGTCTATTAAATATCAACAGACTGTCA
 GAAGGGCGGGAGATAGGGAGGCAGTAGGCCAGTCAGGACATGTAAAGGCTGGGCATGTCTGGCCTGTTCTGCTATGTTCTCAGCC
 CCAGGTTTTAAAGCTCACAACCAACTCTTTGGGCTATTTTGACATAAATTACATGAATTCACATGTCTCAAGTTTTATTTCCTTTC
 AGAACCAAGCTANNN
 TGTCTTACCCTGAAGACCATCTGTCCCTGAAGACATACTGTCTGGTCCC
 GTTAACCTCCCTGGGGGCGAGCCGAAGTAGGTGTTCTATACATGAAGAGAGGACAGAAAGTTCTACATAAGACAACCTCAGCAAAAC
 TTCACCCTCACTGAACACATGTCTAGAATCCCAAGGTGGGACAGGCTCAGTAGTAACAGAACTCCAGCCCATATAAAGCCAT
 TGGCACAAGCCTAAGTCACACCATGGATGTCACTGTCAAGCCATGACAAGGACCAGAAAGAGTAGCACAATTGAGTTGGAGATGT
 GGTCTTAGCATGTATGAAGCCGTAGGTTTGATCCTTAGTACGCATAGCCCTGGTATGGCGGTGCACAGCGCCAATCTGTACTCAG
 AAGCAGAGGCAGGAGGTAGGAGGATTAGATGTTTCCTTAGTACTCAGTAAGTTCTAGACCACCTGGGCTCCATCAGACCCCTG
 GTTGTGTTGTTGTTGTTGAATTTCTGTTTACCATGTCTGTGGAAGGTTAGATGTTTCAAACCCCAAGAGACAGATGCCGCTGGATGG
 ATTCGAACTGTTTCCCAACAGCATCCGAAGGGTGGTTATAGAAAACATATTAGAAATAGAAAACAGTGGGGGTGGGGCTCCGC
 AGGGGCTGTGTTGTTACCTGTTCAAGCGGCAGTAGGATCTGAACATCTAGTCAGGTCAAGGTCTGTGAGGTCTGGACTGAGGCA
 GAGGTCACTGGCCACGCAAGTAAGATCTGAGTCCTTGTGTACAGAGGCTACAGAGAGACAATAGGAAGATTCCACACATGACTTG
 GATGGCCTAGGAATGAATGAGTGAACAGGAAGTGTCTGAGCCACCACTGAGGTGGAGTGGATCACAGATTGTGAAGAGAGACAGCACTG
 TCCCTCTCATGTGGTGTCAAGTGGACTGACTAAATTAAGGAATTGAAGGATAGACCAAGAGTTGAGCAGATGAGATCAATCTGT
 GTAGAACTCCTGGAATCACTGCCTGGGTCCTGAGATCACTGCCTTAAGGAGGGTTCTCCTTGGGGACCTGGATTCCAATGTCACT
 CATAACTCCTAGAAGCTTATCACTCACTCTCAGATTCTCTTAGTTGACAGCATTAAAGGAGCCAGCCAGACTCCTCTACACAAT
 GCTTCAAAGGAGACTAGGCTTTGTGCTGAGTAAATGACAGAGACCTTAGAATCTTGAGAGCTATATACATCAATCAATTAAG
 GTCTCTCTGATGTAATCTGTCTCCAGGTCCAAAGGAGGGGCTGTTCTCATGAATATGGCTCCTCACTCACTGAGACCCCTGCC
 ATGAGCCACAGCTGGTGTAGACACAAGATGAAGTTCTGTGCCCTCAGGTCCTTCATAGTGACAGCTTGACAGGAATTCAGATCAT
 TGGAGCAGCCCAAGAGCAAGATGTAAGAAAGATTTCTAATCAAGGAAGACATCTCCATCCTTGGCTACTGCTCTGGCCACAGG
 TAAGACCAGGAGGAAAGAGAAAGCTAAGGCTCAGATACTGAGCAACAGCCTGGCCATTGCTGTGATGGTTTCTGTCTTGGG
 AACCCCCCAACTGTGGATTCCAGAGCCACCAATGTTACCATGTTGTTGTTGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG
 GAGAGAGAGAGAAATATGATGTTTGGTGGAGTGCAGTCAGGTGTGGGTGGAAGATGGTGCCTCTGAGGGCCCATGCTGAGCCATCC
 CTTCCCATGAGGGTCCAGCCATAGATGGTATAGTATAGTACAGTATAGTATAATATAGTATAGAATAGAGTTTATTAGGGCATG
 GGGAGGGGGGGTTAAGAGGGTAGTNN
 GGCTGTGAGGCATCTACATGCTTTAATATACTTTCAAGGAACTGTCTTATGGATTGGTCTGTTCAAGTCTTGCCAGTAC
 GTATTACAGTATTTCCCAAGCCAAATTGTTTATTAATATATCAGTCCCTCCGAGGGGGGAAGCATCTAGAACTGCCTCTTCCAA
 TCTAGCCACAAACTCTCGTAAGATTCACTAGCTTTTGTCTAATCTCTGAAGGAGCTGTGGATTAGCCCCAGGTGGAGGTAAC
 TCTGCCAGCTAGATACAGCTATCTGACTAATTTCTCCAACTGCTTTTGAATTTTCAAGTTGCTGCTGCTGCTGCTGCTGCTGCT
 TTTTGCCCAAGAGCATAGGCATGTGGGTTTAGTTCATTTCTATTTTCTCATGGAATCTCTCATATCTTTACCTACTCGCTT
 CCAATATTCTAATGTCAAGCTTCCCTCCTCTAGAAACCAAGGAGCTGATTTTTCACGAAATATGAAATTTATCGGAAACCTTTA
 GGCTTCTCCAGACAACATGTGCTTAAACACTGACAGAAACATCTTTCCCTTTTAACTTTTACTGCCCGTAATAAAAAATTAC
 TCGCTCTTAAACGGATGTACAGATCCTCTCATCTGCAGCAGGTACGACGAGATCCTATCTTGGCTGAGAAAATAAGGAATAGA
 AAGAAAAAAGAGAGAAAAAGACTGATCTGCCCGGTGTCCCTGTTTGAAGGCACCAACTGCTGCAGACCTCTGGGCTAATGT
 TTGCTGCGTGAAAGAGTCTCTCGAGCAGATGGGCAAGAGTCAGATGGAGTGACAAAACAGATACACACACACAGAGAGGTG
 TTGGATCTGAATGTAAATGTTCCAGTCGAGCCTCAGACATTTATAATACAGAGTAACAGAAATAGGCACGTTGAAATTTCCAGGT
 GCGAGAGGAGTGAATTTCAAAGGAACAGATAAATGTTTACTTTAGAGATTATCACCTGCTTCAGATCAGCCCTGTGCCAGGCAA
 GAAATTTTACCTTCAGTGTTAATAGCACCAGGGGTTGTTAACTCTTGACAGGCTTCAAGAAATGATGTAGTGTCACTGACCCCGAA
 ATTCTCTAGGCCTTGTAAATTTATCTAGTCTGGAGAATCCTCAATTATCAGGATAGTATATTCACTTGCTCTTGCCATGGAATGT
 AGCTTGTGGTAAAATTTTATCTCAGTGAAGATTTTGTCTCTTCTGTCAGACAACTGAGTTAATGGCTGTAATTTATTCTTTTAT
 TGTAGTCAATCTTAATAGTTACTGAATAGTTAAGCTCCTGCTGCTGTCTGGAATTTTGGAACTGGGAAAGGCTTTAGCTATGTC
 AGAATACAACTTTAAAGCAATTAACAATAAGGTAATACTAAATAGAGAGCAGTGGATCCATACACTGAGTCTCCGGGAATGA
 AAAAATTAATTTTATGGTTTATATAGATTAGGGAGAGAGTACAGACCCAGGAAGGGAGTTTCTTGAAGCTCTTGTCTCATGA
 ACCAGCTTCCAGCTTTTCGCTTTGTCAAGCTGACTCCACAGAGTGCCATGGCAACATGTGGTCACTCAGATGCTGTTGTGCTGCT
 GCTAAATACCTTCTTACCATAAGGGACTCTTATCCACAGGAGCCCTGACCCCTCAATACACTTCTTCAATAGCTGTTTCCCA
 TCCCTGGTGTTTTATAACTGCAACAGAAAAATTAATGGGATACATCTGCTCTTAAACAAAAGGAAAAAAATAAGCAAAACAATAAC
 AAAAGTCATTCAAATAAAGCAATTTTGAAGCAAACTAGGCAATAAACTAAAACCTGGAACAAAGACTTTTTTTTTTCAAGACAGG
 GTTCTCTGTGTAGCCCTGGATGTCTGGAACCTCACTGTGAGACCAAGCTGGCCTCGAACTCAGAAATCCTCTGCTCTGCTCTC
 CCAAGTGTCTGGGATTAAGGCATGCAACACTACTGCTGTGCAAGCAAAAGACTTCTAATTACTTCTTAAAGAACAGACCCAGCTG
 TTTCAAACCGGGCATAGGGGACAGTGTAGATTGGTCTGCTGCTCTCTCACAAGCTGCTTAGTTTCTTACAGCCCTTCCCTCT
 TTTCATATACAAGGTCTCTTTTCTATCTAGCTTGAACCTGGAAGTGAACCTGACCTCTGCTGCTTGGCTCCACCTCC
 CAAATGCTTAGATGACAAGCAGCAGCACTACAGTCTGTTTATATGGAGCTGGGATGAACCCAGGGTGTCTTGTCTAGGCA

500

501

502

503

[illegible]

TGGGCTGCTGGGCGGCCAGGCGGGGCGATCGGGGAGGAGCTGAGGGCTGCACTGGGCAACCACCTGAGCTCCTGTTTACCACC
 AGGGGAGTGCACAGGCGGGCTGGGCTCACAGCAGAGCCAGAGGAAGGGCTCAGGCTGAGCAGGAGCTCCTGACAGCCTGGCA
 CCAGAGGCCACGCGCACTGTGGCGCCTTGTACGAGGCTATTTTACAGCAGGTCATGTCCAGCTTCTCAATCTTCGAGTCAA
 5 TACAGTCTATCCTCAATTTCTGTGGGTAAGACCTCCAGGGACCAAGGATGGGTGAGGTTTCAATCTGGGCAAGAGTGGGGC
 ACAGCCCTTGTAGTGTAGCTGAGCTTCTGCCCTGTGGGCAAGAGAGGAGGTTGTCTGGCACAGGAGGCCACCCAGCCTCG
 GACCCGCCCCAGGAGCCGCCCCCTCAGGGAACTTGAAGCCAGTGGGGACGCGGAGGCGAGCAGAAGAGAACGGGCGGCGGCCCA
 GGCCCCACCAAGTCTGCAGTCCATTAGATGAGGTCTCTGAGCTCTGTCCACAGATCTAAGCTTCCACAGGCCAGGGGCTCA
 AGGCAGAGCCCTGGGATGCTGCCAGAGAGTGCCTGCCACCCCTCACCTGCCTACAGACGCTGGGTCCACCCAGGACTCACCA
 10 TCGATAGTGCAGTGACACAGAGGAGGGGAGCTTTAGACCTGCATGGGATAGGAGACGGGGTGACACAGGCTGGGGTCCAGGAC
 ACCGTAGCACTGGAAGCACTCAAGGCCCTGGCTGGGATGGGGCGGGAGGGTGAGGTGAGGTGCGAGGCTGAAGGGTGGGTTC
 CAGTCCCTCTCACAGCACCGGAGCAGGCTGGGAGCACACAGGTAGGCTCAGGTGCCCTTGGCTACGAATTTGTGGGAGG
 GTCTGTGGCATCTGGAGCCCCAGCATCAAGAGGTCTTACTCCACCTTCAGGCTCCTTCCCATCCCCACCTTCAGCCAGC
 AGCAGCATGGGGCTAGTGACCTTCATGGTCTTGGGTATGGGTGCATTGAGGGCACATGTGGCACAGAGGCTCTGAGCCTGGGAAGA
 15 CTAGGGGAGGCTTGCACCCCGAGCCTGGGAACCTCTGCCCACTTCTGGTTTGTGATGAGGAACCCGGATTTGTTGTGAAG
 TGACACAGCTGATGGCCTCATCCATCATCTCAGAAATGGGAATTGAGGGGTAGAAACCTTCTTCTGACCTGGCTGCTCTG
 GAAGGACAGCATGACCTTGTAGCAAGACCCCTCTCACCCACCCCTTCTCTGCTGGGGCTCCAGAGCTCAGGGTGTGAGCAGAA
 CAGATCCGGAGGGAGGGGCTGCGGTGAGGAGAGGAGGGGCTGCGGTGAGGAGAGGAGAGGTTGTCTCCCTGGGGTGGGAG
 GACGCTTAGGAGAAGTTCTGACTCAATAGAGAGGAGGGTCTGGACTAGGGCTTGTAGTTTCAAGTTTCAAGTTTCTGGTGCATCA
 CAGTGTGTGGTCTGAAGCAGGAGAGAAAGCAGCCGTGAGACTCAGGTACACCCAGGACAGGCCCCCTCCGCTCAGGATGAG
 20 GGTCTCTGGCTGAGCCCACTGGCAGGCCCCGTGCAGACAGAGCCTGGGAGGGGCCAGCAGGCAACAGCTCTGACACTGAG
 ACCCAAGCCAGGACCCCTTGTCTTGTGAGGGAGCAGAGGCCCTGTAAACGGGGTGGGAGCAGATGGGGCTCCCTTGGGGC
 AGGGAGGAGGGNN
 NNN
 25 NNN
 NNN
 NNN
 CACCCGAGATTTGTTCTTACGGAGAATCAGAAGACACAGGAAATGGGCCAGGGGTGACTGACTGCAGACTCCACCCCTCCCCA
 ACCAGTGCTGGGCAGAGGAAGAGAGGGCTGCTCGGCTGTGGGACAGAGCCCTTGATGAAGACAGATAAGAGCTGAGCCTGAG
 CATAAGGATGGGTGCGCTCTCCGCTGGGTGGTCCCTTCCGAAAGCAGAATCACTCTGTGCCCTCAGGGGTCTCTGTCTGGAGAG
 30 TCCATGGCATCTGAGAGGATGGGCAGGTGAGGTGGGGTGGCTCTGAGAGCAGGAGGAGCAAGGGCGGAGCTGGAGGCGTCAGG
 CCCAGAAGACCCCTCAGTGACTTGGGCGAGCTGTGGGCAAGGCTTGGACCCAGAGGCTGACCAACCCGCTGGCAGCAGACCA
 GAGCACAGGCCAGACTGAAGGGCAGCGCCAGGGGGGCCATGGTCCAGGGTCACTCTGCTGGCCCTCGCGCCACACTGCTCAG
 GTCCCAAGGCTGATGATGGCTGAGCAGACATATAACCAAGCAATGGAGAAGTTAGAATATTGCTAGGATGACTGACTTGA
 TTTTGGACTCTTAAATATATGTTTAACTCTGACATCTAAGCAGTGCATGTTACATGCCAGTCAAGCATGAGCATCCCCAAG
 35 GGTGTGCACTCTGTATCTATGGATAATGAAAGCAGGCTTTCACACAGCAAGTTATCTCACTTCTGTGATCAACTCTGATAT
 CTTCTACTTTATTTGAAAGAGTATTGATTGTGTCCCACTGCAGTGAATTTACACCTCTATGTACATGGTCCCCAGTTTATGGGCA
 GGGCGGTTATTTGTGTTTATTTGTTTGTGGAGCGAGTCTGTCTGTGCCAGTCTGGAGTGCAGTGGCTGATCTCGGCA
 CACTGCAACCTCCGCTCCCGGTTCCAGCGATTCTCCGAGTGTGGGATTACAGGCGCCGCCACCATGCCCCGCTAATTTTT
 TTATTTTAGTAGAGATGGGGTTTCCACATGTTAGGCTGGTCTCGAATCTCTGACTCAAGTGATTGCTGCTGCTCAGCTTCCCAA
 40 AGTGCTGGGATTACAGGCATGAGCCACCACCTGGCCTGTTATGTTTGTGAGATAGGGTCTCCCTCTGTCAACCCAGGCTAGAGT
 GCAGTGGTACAATCACAGCAGATTGAGCCTCAACCTCCCTCCCACTCAACCTGAGGGGAGGGAGAGGAGGAGGCTGAGGCT
 CATCTCAGGGCTCTGAACCTGAGCCTCCACAGGGATTTCCAGTCTCCACACTGGCCTGGAATGGGCGCCCTCTCTCTGCA
 CCCCATCCAGCCCCACTTCCAGCATCTGCCACGGATGAGCCTCCGAGGATGGGAGCAAGTCTGGCACTGCCCTCACCCG
 45 CCCCCCACTCAGCCCCCTGTGGGACCTCAGGAGGTAAGGCCAGGAGGAGGCTGTGCCACCTCCCTCCCTGCTGCTGCTG
 CCCCCTGACGCCCTTGTACAGAGGCTCTTTTACAGCAGGTCTGTCCAGCTTCTCAGTCTTCAATCAATCAGTCCATTCTCAGT
 TTTATGAGGTAAGACCTCCAGGGACCAAGGATGGGTGAGGTTTCAATCTGACACACAGGAGGGGCCAGCCCTTGTCTAGT
 GTAGCTGAACCTCTGCGCTGTGGGTGAAGAGGAGGTTGTCTGGCACAGGAAGCCCCACCCGACCCCTTGTGCTCCACCCAGGAC
 CGCCCCCTTACGGGAACCTTGAAGCCAGTGGGACACAGAGCAATCAGGAGACAAGCAGAAAAGAACAGGCCGCGCGAGTCTGC
 50 AGTCTTCCAGGCTCAAGCGATCTCTGCTCATCTTCCAAGTGTGGGACACAGGACCTGCCACTACCCCTCAGCTATTGA
 AAAAAGAAATTTATAGAGATGGGATCTCAATGTTGTCCAGGCTGATCTTGAACCTTGGGCTCAAGTCTCCCTGCTCAG
 CTTCCCAAAATGCTGAATTTGAAGCGTGGGCTCTGCACCCGCGCTGGTCCGCAATTTAAAAACGACAGCCACCATTCCTCTC
 CAGAAAGACCCAGATGCCCTTGGGAGAACCAGCCTCTCCATGGAGGAAAGCTTGGGATCTGCCTTCCACCTGGGAGGAGAGG
 GATCTGTGGAATCCTCTGACGCACTTCCCTCAGTGCCTGATCTCAATAGTAGAAAAAGTAAAGAAATATACAAAGATA
 55 GCAGATACAGGAGACAGTTCCCAATAGCTGAGCGAATAGCGCAGAGCAATATTGAAGACCTAATAGCTGAGACATTTCCAGA
 ACTGATAAAGTGATCCAGCCACAGATCAAGCAGCCAGAAATTCAGGCAGCATCAACAAATAATAGCCCACTGACCCGCT
 GAAATGCAAGACCAACAAAAAGTCTGTCAACAGCCAGAGAAAAAGATCAGCCACAGGGGTGCGTAGTGAGAAAGGACAAC
 TGTGGAAGCCAGGAGAGACGACGCTGAGTTCCACAGGCAATGGAAGAAAGACTGTGACAGAGAAAGTTGTGCCAATATAGT
 60 TGCATAAAGAAAACTTTTAAATTAATTAATTAATTTATTTATTTAGACAGGATCTCACTTTGGAGTGAGTGGCGGGAAC
 ACAGCTTATTGTAGCCTTACCCAGGCTCAAGCGATCTCCACCTCTGTCCCGAAGTAGCTAGGATGACAGGTGTGCACCACCA
 TGCCAGCTAATTTTGTATTTTATAGAGGCGGGTTTCTCCCTGTTGCCCGCAGCTGGTCTTGAACCTCCCTGTATCAAGGAATGC
 TGGGACTACAGTGTGAGCCACAGCACCGGCCAAGAGGCTTTTAAAAAGTCTTTTCGGGACGGTGGCTCATGCTGTAAATCC
 AGCACTTTGGGAGGCCAAGGCGGGTGGATCAAGGTCAGGAGTTCAAGACCAGCCTTGCCAAAGCGGTGAACCCCGTCTCTACT
 65 AAAATTAGCTGAGTGTGGTGGTGGGACCTGTAATCCGCTACTCGGGAGGCTGAGGTAGGGAATTGCTTGAACCCGGAGGAGCA
 AGTTGCACTGAGCCAGATCACGCCACTGCACTCCAGCTGGCGACAGAGACAGACTCTGTCTCAACAAAAAAGAAAAAGAAA
 AGAAAGTATCTTTAGGCTAGACATGGTGATGGTGGCTCTCACTGTAATCCAGCACTTTGGGAGGCCATAGGAGAGGATGCT
 CTTGAGTCCAGGAGTTCCAGACAGCCTGACCAACCTGAGAGAACTGTCTACTAAAAATACAAAAAATAGCCGGGCTGGT
 70 GCGCATGCGGTAGCCCCAGCTACTCAGGACGCTGAGGACAGGAGAACTCGTTGAACCCAGGAGGACAGGTTGTGGTGTGAGT
 ATTGTGCCATTGCGCTCCAGCCTGGGCAACAGAGCAAACTCCATCTCAAAAAAAGAAAGTATCTTTAGGCGGGGACCA
 GTGGCTTGTGCTGTAATCCAGCACTTTGGGAGGCTGAGGTGGTGAATCACTTAAGGTAGGAGTTGAAGACAGCTTGGCCAA
 CATGTGAAACCCCTCTTTTACCAAAAAATACAAAAATAGCCGGTGTGGTGGCAGCAGCTGTGATCCAGCTACTTTGGGAGGCT
 75 GAAGCAGGAGAACCACTTGAACCCAGGAGGCGGAGGTTGACGAGCCAAAGATCTCGCCACTGCACGCCAGCCTGGGCAACAGAGC
 GAGACTACATCTCAGAAAAAAGCAGTGATCTTTAGCCAGAGGAAATGGTCCCATCAGAAATCAGAGATACCTCAAGTGATGA
 AGCAGGATTCGTAGAAATGTGGTGTGAGTCTAAATGAACATCAATCTATTAAAAAAGATAAAATAGTGGCGCGGCTGGCTTAC
 GCCTGTAATCCAGCACTTTGGGAGGCGGAGGGGGCGGATCACCTGAGGTGAGGAGTTCAAGACAGCCTGACCAACATGGTGA
 ACTCCATCTCTACTAAAAATACAAAAAATAGCAAGGTGTGGTGGCAGATGCTGTAATCCAGCTACTAGGAGGCTGAGATG
 GGAGAACTACTTGAACCCAGAGGCTCTCACGCCATTGCATTCCAGCTGGGCGACAGAGCAAGACTCCGCTCAAAAAAAGAA

5 AAAAGTCTGTCTTGTGGGAGATTAAAGTTTTGTGGTGAATTAATAATTCATACCATAAATACAAACCTGGAAAGGAGTGAATAC
AATGAGGCGAACCCTAGGGCGGTTACACAGTGGCCACAGCTGTAGTCCCCTACTCAGAAGGCTGAGGCAGGAGGACGGCTGG
AGCCAGGAGTTCAAGACCCACATGGGCAACATAGTGAGATGGAGCAGGGACCCCTCCTAGGTGCTGCCAGGCTCTCCCAAGCTT
GGAAATCAAGGAACACTCTTGAATCCCTTCAAGGGAAATCCAGTCACTTGCCAGCCTTGAAAGGTAAGTGAGCAGCCTGCCAGG
AAGGCGACGGGAGCAGGGTCTCCCAAGCAGGCCACAGCCACAGGTGGTTTGTCTCCCTATAGAACTAAAGCATAACATACATTC
TCAAGTCTTTAGAAACCCCAACCGGTGGAATGCGACTGCTATCACAGAGACCCAGATAAGGGGGAAGTGAAGTGAAGTCTC
TGGCCGTGTTCTCTGTATGAATTTCTTCTTGAGGGGCTGGAGGGAGTCAAGCTGTGAGCCACTAATGTGTGCCCCATGCACA
CAGCACCTTGGCATAACTAATCCATCTTAGAGACTCCATTGTATATCTTACAGGGCACTTGGCCAAACAAAGGTAAGATGTTTG
CTTAATAAACAGTTAAAAATAAGCCTGCATCCAAACAGATGAGGACGCAAGCAAGCGCACTCTTCAGATGTCACTTCTCACGGG
10 AGGCCTCTGTGATTGCAGAAGGAAAGGCCCCAGCAGAACTCACCATCTGCCGCTGAGGCTCCACCACCTCGAAGACATCCTTGCA
AGATCCACAGACTGGCCAGACCAGGAGTTCTGTCTTCTTGTGTCTTCTCACTCTCTGAGTGGTTCGTGAACCTTTC
TCCTATCTCTGTTTCTCTGGATGTT

15 HUMAN SEQUENCE - mRNA
GCTCCGGCCAGCCGGTCCAGAGCGCGAGGTTCCGGGAGCTCCGCCAGGCTGCTGGTACCTGCGTCCGCCCGGCGAGCAGGAC
AGGCTGCTTTGGTTTGTGACCTCCAGGCAGGACGGCCATCCTCTCCAGAAATGAAGATCTTCTTGCCAGTGTCTGTGGCTGCCCTTC
TGGGTGTGGAGCGAGCCAGCTCGCTGATGTGCTTCTCCTGCTTGAACCAAGAGCAATCTGTACTGCTGAAGCCGACCATCTGC
TCCGACCAGGACAACACTAGCTGACTGTGTCTGCTAGTGCCTGGCATTGGGAATCTCGTGACATTTGGCCACAGCCTGAGCAAGAC
CTGTTCCCGGCTGCCCATCCAGAAAGCGTCAATGTTGGTGTGGCTTCCATGGGCATCAGCTGCTGCCAGAGCTTCTGTGCA
20 ATTTCAAGTGCAGCCGATGGCGGGCTGCGGGCAAGCGTCACCTGCTGGGTGCCGGCTGCTGCTGAGCCTGCTGCGGCCCTGCTG
CGGTTTGGCCCCGTGACCGCCAGACCTGTCCCGGATCCCCAGCTCAGGAAGGAAAGCCAGCCCTTCTGGATCCACAGTGT
ATGGGAGCCCTGACTCCTCAGTGCTGATCTGTGCCCTTGGTCCCAGGTCAGGCCACCCCTGCACCTCCACCTGCCCCAGCC
CCTGCTCTGCCAAGTGGGCGAGCTGCCCTCACTTCTGGGGTGGATGATGTGACCTTCTTGGGGAGTGGCGAAGGACGAGGG
TTCCCTGGAGTCTTACGGTCCAACATCAGACCAAGTCCCATGGACATGCTGACAGGGTCCCCAGGGAGACCGTGTAGTAGGGATG
25 TGTGCTGCTGTGTACGTGGGTGTGCACTGCACTGAGAGCAGTGGCGGCTTCTGGGGCCATGTTTGGGGAGGAGGTGTGCC
AGCAGCCTGGAGAGCCTCAGTCCCTGTAGCCCCCTGCCCTGGCACAGTGCATGCATCTCAAGGGCAGCCTTTGGGGTGGGGTT
TCTGCCACTTCCGGGTCTAGGCCCTGCCAAATCCAGCCAGTCTGCCCCAGGCCACCCCACTTGGAGCCCTCCTGCTGCTTTG
GTGCTCAAATAAATACAGATGTCCCC

30 HUMAN SEQUENCE - CODING
ATGAAGATCTTCTTGCCAGTGTGCTGGCTGCCCTTCTGGGTGTGGAGCGAGCCAGCTCGCTGATGTGCTTCTCCTGCTTGAACCA
GAAGAGCAATCTGTACTGCCTGAAGCCGACCATCTGCTCCGACCAGGACAACACTGCGTGACTGTGTCTGCTAGTGCCTGCTG
GGAATCTCGTACATTTGGCCACAGCCTGAGCAAGACCTGTTCCCGGCTGCCCATCCAGAAAGCGTCAATGTTGGTGTGGT
TCCATGGGCATCAGCTGCTGCCAGAGCTTCTGTGCAATTCAGTGCAGCCGATGGCGGGCTGCGGGCAAGCGTCACCTGCTGGG
35 TGCCGGGCTGCTGCTGAGCCTGCTGCCGGCCCTGCTGCGGTTTGGCCCTGA

MOUSE NOMENCLATURE	
ICSGNM	Rasa2
Celera	mCG21645

HUMAN NOMENCLATURE	
HGNC	RASA2
Celera	hCG16062

[illegible]

[illegible]

5 AACAGTGTGGTAAAAATATCACTCCAGTGAAATTCGGGTCTGCAGATTAAAAACACACACACACACACACACAAAGCACAA
AACTTGGTTTCTGTGGCTTAGGCAATCTCACTCCAGAAATTGACCATTAAATTCCTGGGAATATTTTATTTAAACCTAGTTAA
ACTAAACCACTTGTCTTACCCTAGACAGTTTATTTATTTTATTGCTCATCTTAGCTCAGGTGATGTTGACTGTTTCACA
AGGATACATACTGAAATCAAGAACCCCTCCCATTTCTGCCCTTCTTTAGCTGGTAGATCAAGGTTGGTTGCCCTCCGGATC
10 CTTGTAAGGAAATGCCCTTCTGTGTTTCTGAACTGACACGTGGGCTTTGTAAGGTGATGAGAAGTGGCGGAAACATTAGCAGGT
GCTGAAGTCACAGAAATGGGATGATGGCAGTTTGACAATGAAGAATCTAAGCAGTTTGCGAGTGTGAAGTCACCACTCTTTCTA
CCACACTGAGAAACCTTGGGGAGAACCTGGTAGCTCCCTGTAGCTGGAGATGAGCTGTTAAGCTCAGAATGCTCTTTGGGAGC
ATATTGTGGAAGTTCTAGAGGTTAGATAATGGTCCACACTTTCTTCAGTGTTCATTTCTAATTTATTGTGTCCTATAGATTCA
15 CAAGGTATAAATAGTATCAAGTTGACAGATCAGAAAAACAGCGGGTGGGGAGATGGGCTCAGTTGGTAAAGTGCCCTGCTTAGCAA
GCAGGATCACCAGAGCCCAAGTAGAAAAANN
NNNNNNNNNNNAGAGAGAGAGAGAGAGAGAGAGATCAAAACACCAGATGTTGGTCTCAGGCACCCACACCCATGGGCATGCATG
CACACACAGCTAGTGCACACAGTCAGTACATTAAACAGTACACACACCACACAAACACACACACACACACACACACACAC
15 ACACACAGAGACCATCATATAGCTGTTTTTACACAAACCCAGTTTAAAGAAATCTATTATCGCAGACAGATTTTGTGTTATAGAC
TGATTAGTGCCAGTTTCTAGGGCATTTTAGTGTCTAGATATCTGAGGGTTTGAATGTTGAGCTTCTTACCTGAATTCACG
ACACAAAGTTGTTAGATATCTTAGAATTTTCATCTGAACCTTAGTAACAAATAGGAGTATTTTGGTCTGAACCTACTTTGAT
ATAAGTAGCATACCTAAAGGTAGTTTGTATGTCACCCCTCCATTATACCTATATTAGGTTGAAAAAAGTTTATAGTTTATA
20 TGTGTGTGTGTGTTTATGTCTGTCTGTCTTTCAGGCTTGATATGGCCTCGTTTTTGGTTACCCCTTTTCTAATTAAGTCA
ACTGTAACATTTTGAAGGCTCTACACTACCTTACACAGGGCTTTCTCTCAGGGATACAGGTTATAAAGGCACAGCCTGCGA
AGATTTGTGGGAAGTGTGATATATTGTTTCAGTGAGATCTGTGAGACAGTGATGTGGCCCAAGAACTACTCACTTAGGATTGGA
25 CATTTTCAGACCAAGAAATGACTTCGGCTGTTTGACAAAGGAGATAGATTAACTTAGCTTAGGAGGCTGTTGATGTCAGTA
CCTTCAGCCCCAGCCCCCTAAAAAAGTCTGGGTGAGCCATGGGCCATCTCTAGGAAGGAGTTAAGTAGGAGATAAGCCTTATC
TGATGCTCTTGTCCAGCCTGCACTAACGTTTCTGGTGTAGACAGCAATTGAAGCAGAAAGCCGTTCTGCTTCATCTGTG
TAGGATAATATTCTGTGACTTCAGGCAGCTGTTTACTCTTGAGCTGTGGTTGTTTTATCTTCTCATCTTAGAGTGGACTAG
30 TGCTTTGTCAACAGACACTTGGCTCAGCTGTTTCTCTGCTGAGATGTTGTCCTCCCTCCCTTATTTATGTCAGAGAGCCAC
ATATCTTCCAATGCAATCAAGTCTCCTCTGACAGATTTGCCCTGTTTCTAGCCATATGGCTTTGATGCTTAAAAAAGAAAA
ACGTAATAATTCTAGACCATTTTCTTATAAAAAATCATTTGTATATGTCCTGTTATGTTAATTTAGAAATCATCTGTTTATA
ATATTGTGTGCTGCTGGTGTGTGTGTCTCAGTCTCACTAGATCAGGGCAGGCCTTAGAAAAATACCCCTATCTCTAGTGTAT
35 AGATACTTTAGAGCACTGTGTATCTGGATAAGAAAGAAATTTCCATATCTCTGGACAGATTAGCAGGGTTAGCTTTAGTAAAGGAA
AGCTTCTGAGTCTCTGGAAGTTCTTTATCTTTCTTGAAAAGTTGTAATGTCTGCTAATCTTAGGTTGAACTAGGCCCCAA
ACTTGCTCTCTTAGGAAAAGGATTACATTTTTCTAAATGCTGGCTTATTAATAGAAATATTAATGTTTCTGACTGTGTCCATT
AGTTTTGTACTAATTTGGTCCCCAGAGCTTGGAAAAGAAAAATTAATACTCATCTTACCTAGAAATGTTTTATTTGACATGAC
40 ATTCATGCTAATAATTCAATTATTCAGATGTTTGAATGAGATGATGAATCTTAGTAGAGGAATTTAAAGGGTTTACTCATGC
TAATAATTCATTATTGTGATGTTTGAATGAGATGATGAGTTCTTAGGACGGAAGAAGAAATCCATCTTGAGATGGATAGAAA
CAGAGGAAAAGGGACCTTTGTAAGAGTTACAGAGCATTGACTAATCATTTGCTCTGTGCAGGACAGGAATAACCTCAGGGAG
CATAGAGTTTGTGAAGTGAAGAACTCTTGAATAGCCCTGGACTGAGTGGGAAGTAATGATAGTAATAAACCCACCTTTT
ATCCTTTAATTATAAACCTTAATCCTATTCTCTGTTAAACGTGCTTGTGAAATATTGTAATAATCAGATTCTGTGCTTTACCT
45 ACTGATATATTTATACCTTTTATACCTTAGTAACAGTTTGTGTATAGTCATGTGTTATTGTTAAATAGGAACATTTGTGTA
TGTTAAATTTTATGACATCTAGTTTGTGTAATGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTG
TAGCCTTGCTGTCTGGAACCTCACTCTGTAGACAGGCTGGCTCAAACTCAGAACTCGCTGCTCTGCTCCCAAGTGTGCTGG
ATTAAGGGCGTGCGCCACACGCCCCAGCTTTGTGTGATGTTTAAATCATCAAAATCTCTAGCTAGATTGGCTTCATTCTCTTGT
50 GT
TCTCAGACATTGTCTCAGGAAACACTGTCCACCTCTCTTATGGCTTGGAGCCCTACTAATTAGTCTAGACTGGCTGGCCAGCAAA
CTCCATGGATCCCTCTGTCTTACCCTCTCTGTGCTGGGTACATGACAGGACCTTCACACCCAGCATTTTTGGCTAGTTTCCAGG
AGGTTATATCAAAATGAGCCAGGTGGTGTGACATAGGCTTTAATCCAGCACTTGGGAGGCAGAGACAGGCAGATATCTGAGT
55 TCAAGGCCAGCCTGGTCTACAAACCAAGTTCTAGTACAGCTAGGGTTACACAGAGAAACAGAGTCTCATTGCCACCCCCACCAA
GGAAAGAAGAAAACATTTTATTATTGAGTGTGTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTTAA
AAGATTATTATTATTATTATGAGTACACTACAGCTGTCTTCAGTACATTTAGAAAAGTGCATCGGATCCATTACAGATGGTT
60 GTGAGCCACCATGTGTTGCTGGGAATTGAACCTCAGGAACTCTGGAAGAGCAGTCAGTGCTCTTAACCACTGAGCCATCTCTCAG
CCCAAGCCTTCTCTCAGCCCGGGTATTTTCTTTTATTACATTTCAATTTGTTACCTGTTCTCTCCCAAAATGTTATCATCCCCC
TCCCTCTGCTTCTATAGGGTGTTCCTCCACCCACCACTCTGCTCTCCCACTCGAATTTCCCTGCTAGCTGGGATCAAGCCTT
CACAGGACCAAGGGCTCTCCTCCCACTGAAGACAGAGAAGGCCATCCTCTGTACATATGTAAGTGAAGCCATAGGTCCTCATG
65 TGTACTCTTGGTTGGTAGTTAGTCCCTGGGAGCTGGGGGGGGGGGATATTGTTCTTCTATGGAGTGCAAACCCCTTCAGT
TCTCTCAGTCTGTTCTTAACCTCTCCATTGGGAGCCCATGCTCAGTCCAATGGTTGGCTGATTGTGAGCTCTGGCAGAGCC
TCTCAGGAGCTGCATATCAGGCTCCTGTGACATGCTCTTGGCTTCCCAATAGTGTCTGGGTTTGGTGAATGATATGGGAT
GGATCCCCAGGTGGGGCAGTCTCTGGATGGCTTTCTTCAGTCTCTGCTCCACACTTTGCTCAGTATTGCTCCCGTGAATTT
70 TTCTTCCCTTCAAGAAAGATGAAGCACCCACACTTGGTCTTCTCTTCTTGAGCTTCATGTGGTCTGTGAATTTGATCTTGGG
TATTCTGAGCTTTTGGGCTAATATCCACTTATCAGTGAGTGCATAGCATGTGTGTTCTTTGTGATTGGGTTAACTTACTTAGGAT
GATATTTCTAGTCCATCCATTGCTTACGAATTTTCATGAAGTCATGGTTTCTAGCTGAGTAATCTCCATTGTGTAATGTACC
ACATTTCTGTATCCATCTCTGTTCTTTCAGCTTCTGGCTATTATAAATAAGGCTGCTATGAACATAGAGGATCATGTGCTCT
75 TGTATACACTGGAGCATCTTCTGGGTATATGCCAGGAGTAGTAGAGCCGAGTCTCAGGTAATACTATGTCCAATTTTGTGAGG
AACCACAGACTGATTTCCAGAGTGGTGTACAGCTTACAATCCCACTAACAATGGAGAAGTGTCTCTACATATGACAGCTTT
CCTCTTCTCCACATCCACACAGCAGCTGTGTCACTGAGTTTCTGATCTTAGCCATTCTAAGTGTGTAAGGTAAGTCTCAG
GGTGTGTTTGTGATTTGCAATTCCTGATGACTAAGGATGTGAATATTCTTAGCTGCCATTTTAGCCATTGATATTCTCAGTTG
AGAATTTCTTATTAGCTCTGTTCCCAATTTCTAATAGGGTTATTGGTTCTCTGGAGTCTCACTTCTGAGTCTTTGTATATA
TTGGATATTAGCCCTCCATGGGATGTAGGGTTGGTAAAGATCTTTCCCAATCTGTTGGTGGCCATTAGTTCTGTGACTGTATC
CTTTGCTCTCAGAGGCTTCAAAATTTATGAGGTCCCATTTGTGCTGATTCTGATCTTAGAGCATAGGCCATTGGTGTCTGTTCA
70 GGAATTTTCCCTGTGCCATGTGAGATCTCAGAAGAAGATGGAAGATCTTTATGCTCATGGATTGGCAGGATTAATATAGTA
TAAATGGCCATCTTGTGAAAGCAAGCTACAGATTCAACGAAATCCCACTCAAAATCCAATCTTCTCATAGAGTTGGAAG
TCAAACTGTATTACAGAGCAATAGTGATAAAAACTGTATGGTACTGGTGTACAGAGACAAGCAGGAAGATCAATGAATAAAATG
AAGACCAGAAATGAACCCACACACCTATGGTTACTTGTATCTTTGACAAAGGAGCTAAACCAATCTAGTGCAAAAAAGACAGCATT
75 TTCAACAAATGGTGTCTCTCAACTGGAGGTCTCATGCAAAAGAAATGCAAAATGATCCATTATATCTCTGTACAAAGCTGAA

[illegible]

511

AATTTTGTATAGAACTGTGCTAAAACCAAGTGTCTGATACAGGCTTTAAATCCAGCATTGTGAGGCAGAGCTGGTCAGGTCT
CTGCTGAGGTTGAGGCCAGACTGGTTTACATAGCAAGTCCAGGCCAGCTGGGCTACATAAGGAGAGTCTATCTTTAAAAA
5 AGAACCGAAACCAAACCAAACCAACCAACCAACTGCTGAAAGAAAGTCTTCAGAGACAAAGCATGGAGGATTCTGGGACTTGT
TGGGACAGCATGGTGAATGAACAGTGTGCAACTGTATTTATCCCATTTGGATTCTGGAGGATGCTATGGTACCTTGTACCT
CTCCACACACTTGGCTGTGTTTCTGTGACATTTGGCTGTGCTCTTTCTGTTCTTTCTTGTCTTTCTCTCTGCTTCC
10 TTCCCTTTTCTTCTCTCTCTATGCGGGGTCTAGCCTTGTAGCCAGGTTGGCATTGAACCTTCTACTCTACTCTCAGCCTCAC
ATATTGGTGGTGTAGGCAGGCCCTCTGCATAGCTCTTTGTCTTGGGTTCTTACAATTTGATCTCTCATAAGAAAATATATA
GAACAAAAAGTAAACCTTGTAGTGGCTCCGTGAGTGGGTGAAGGAACAGCTGTCAAGCTTGAACCTTGGAGTCACTCCAGAGC
15 CCACATGGTGGAAAGAGAGGACCACTCCACAGGTTGCTCTCTGACTTCACATGAGCGCCCTCTCAAAAATGAGAATAGTACA
TAATTAACAAACAAACCAACCACTAAAGGTGCTTAGTAGCCCAAAATATTGAGAGTAATGAATTTCAAAGATTTTGTCAACAGC
CTTATGCCCATATTTAGAATCTTAATTAATTTTTCACACTTGTGCTTGTGATTGAGTCAAGATGAGCTTTTCTTGTATGAATGAT
GAAATGTACGGGAAGGCTGCATGATGTGTCATATAATGAAGGAAGTAAAGCACAGCTGGGATTGAGACCTGAAAATATTTAA
ATTTGAGTTTGTACAAATTTATATCACAAGGTAACTAGTGATTACAAAATTCATAGTAATTTTGTAAATTTGAGTCCATAAATG
AGTACTTATAGTTTGAATATCTAGCCATATATGAGAAAATACCCCTTAACCTTTCTGAACGTTTGTATAGTGGAAAATGATGA
20 ACCAGTTTCTTTATTTCTTCCACCTTTAAAAAGAAAATCAATTTGAAGATAATTTCAAGCTAGCTGTGCTGCTTGTAGATCG
TAAGGGTATAGCTAGCTAACTAGATAAATCTTGCATTCTGAATGCCCTCAATCTTACTTTCTAGAATAGGGCAAAAATTAATCCTT
CTTCAACTTGATTTTATTATAACGTTCTTAATCTGTCTAAATTTTGTCTAACTTAAATTTGGAAGTATACATTTGTAGGTCT
TTCTAACTTTTCCACCTTTGGAATTTTCTTCTGAGTTTATACTCTGAATTTAAAAACAGGAAAATCTTTAGAATTTGAAAAA
GATTTAAGAGATTTTGTCTTAAATATCTCTAAATCAGAGCAAGTGTCTTAATAATTAAGGATTTTAAATTTTAAAGAGATTCAGAT
25 ATTTTCAAAAGGAGATATACAAGTATCTCCAAGACACATGGAAGAGATCCAGTTCCATGAGCCACAGGAAAATACAGTTTAAA
ACCATTTTGTGCTACTATTAGGACATAATCTGAATGATAGAACTTTCCCAAGTTGACTGGCTGTGAGAGGTGATTGAGAGGTT
ACAGGGAATTTCTGGGGATAGGTGATAGGTTTATGTTTAACTTTCTCTGAAAATTCATACGTAAATGTTTGTGTTGTAAC
TCGTACCCACTCCGTACCTCCCTCATCTGATTCCCATGACACTCTCTGAATTCCTTCTAGCAAGCTCTCTGCTCTCATGTGT
30 TTGTGGGTATGATAGGACCACTGAGTTTAAATAGGGCTGCTTGCATACGGGTAGGTGGAGCATGATGCTCTGGGCACTGGGCA
CAACAAATGGCTACCACTGAGGAAAATGATTTCCCTTTCCAGTAGCCACTAATTTCCCAAGCCATGATAGGTGAGTCAAGTGA
AGTGTCTGTGCGTAAAGCATTGAGAACTTCAGTTTGGACAGTTAGCACTCATGTAGAGGCCAGACATTAGGTGTAATCCAGA
GCTGAGGTGAGGCTAAGAAGATCCTTGGGACTGTGCGGCACTCCATATAGCCACGTACATGAGTGTGAGTGAAGAACCTGT
TGGTTTGGTTTGGTTTGGTTTGGTTTAAAAAAGGTAAAGATAGATGAAGGAAGTGTCTAATATCCACTTCTGATCTCTATA
35 CTGATGCACACATGGGAGTATGCACACCCACACAGGTCACACAGGTGCACACAGGTGCACACAGGTCAAACTCACTGAGACTG
AAAATTAGCTCAGTCTTGTAGACAAGCATGAAGACCTGAGTTTGGTTCCTCGGCACACATAAACTGTATTGCAAGTTGTTGAA
ATGAGCTGGGCTTATATGAACAGGAAGTCCCTGGAAGTAGGTAGCCAGCAGTGTGGCCAGACAGGACTTTTCAAGTTGAGGAAA
GACCTGTATCAAAAATTAGGTGATGACACTCACTAGGTGATTGACCTCTGGCCTTTATACTCAAAACAGTCACTTGTACAC
40 ATATGTATACATATCAAAAGAAATCATATCACTGGGCTAAGAATAAATCACTAGTAAAGAGCACTAGTGTATATAAAGTTAAATG
TATACGATTTAGCTTAAATCAGAATGGGGGAGATGTAAAGAAATTTAAATCCAGCATCATGCTGTTCTGGCAAGGGATCACAT
CCAAAGCCTTCTAGGACTCTGTGATCTGGCTGAGGTACAGGCTCACCTTAGCACACAATTTAATCCTAAACACGAAGGTAAAG
TTAATTTGTAGAAGGAAGCAGCCGTGAGGGGAGACAAAATGACAAGTCAAGAGAAAGATTTGACAGAATGAGTCAGTGTGCGATA
TGCTCAGCTCTCACAAATGAGAAAGAGAGGTGACTTAAAGAGAGCAGCATAGAGGGTGGGAGAAATTTTACCAAGGTAGGTTGCA
GATAAAGACAGAGAATAAGAAGAGCCAGAAAGATTAGAACAGATTGCCAGAGTTAGTTTGGGCAAGCAGAGCAATTCAGTCAG
45 ATGCTAAGAGGAGCCAGTGTGAATCAGTCAGCTTGGAGAGGAGTTTGGTTTCAAGACAGCTGAGTTGAACCGCCAGCCAGAGTTGA
AAGAGCTGAACAGATGAGATTATTCAATAGTAAAGCTCTGAACCAACCACTGTATCTGGCAAAATAAAGATACATTTACATCTGT
CATAGCATACACAAGCTCCCTGGCTCAAACTCTGGAACCCACCCCACTGCTCAGCTATCTAAGGTGCTAACAGTATTCTATATT
TTGATTGAGGTAGAAGTACACAGGTTTGTAAATTTATCAAGACCAAGCCCTCTATAGATCAGATTGATATTATATAATTCAA
AATTAACCTCGGAAAGATAATAAAATGCTTAATGGTCTATTCTAATATAATTAATATTTTATATAGCATATTCAATTTTAGAT
50 ATTCAGTATTATACAGCTGTTGCGGTTATATCTTTCTAAGATAATAATACGAATGGCTTGTCTGACTCTCAATCATGTGCTCAGCT
TTGGGTGAGCATGGCTAGGCAGGTAATCTCTGTTTCAAGGACCTCTGCAAGCTGTATGTTTGAATTTCAATTTGGCACCT
AAAGTCTCTCAGTTTCACTCGAATTTGTATAGAATTTGTTGAATTTCTAAGAATTTAGTTTATAATTTTATAGTATTTTGTG
AAGTAAATTTGAATGTGATTTTATTTATGGTACCAATTTAATAGTGATAATAATATATATTATTTAATATAAGAGATTTCTC
TTTTCTCTCTAGTCCATATTTTCAAGTGAAGATTTTATTTTGAAGTTTCAAGAACTTTCCAGTATTGCTTTTATGTTTATGATA
AAAATGTTTCAAAAGAGATCTTCGTATAGGTAGGTACTATTCAATATTATTAATTAACACATTAGTATTATGTTCACTTTCT
55 GTGTAAGTCTTTGATATCTGCTTATTAAGATAAAACCCATCAGGCATAGACGTTTACACCAAGAGACTGGCAGAAGGTTGCTGTCT
GTCGCTCCATCTCAGGCTCTCTATTGTGACATAGAGTTGCTGTCCATCTCAGGCTCTCTGAGTTACAGAGTCAAGCTTCCCATCTA
GAGAAAAGAAAAACCAACAAATATTTTATTAAGAAAGCAAACTAATTTTAAAGAAAACGATTGTAGTTAAAAACAAACCTAT
AGGCACTGAACAGATAATTTTACTCTGAAATGTTATACCGGGGTGCGGTTGCTTGGGAAGATGAAGATGAGGTGATTTT
60 CCTGTGATCTGAACATATAGTAGGAAGACTCGTCTGTGCGGCTTTAGGCCATGCTTGGTTAAATAGTCTTAAGTTGAGGCA
AGGTGGAAGTTGAGTCACTGCTGTAACTGCACCGATGTGATTTTGAAGATGTGGGATGAATGCTCAAAGGAATAAGCATCCAC
ATAAATTTTTAAACCCCTCCCTTTAAAGGTTGAGGACTGTCTGTGTTTCCCTTCAATTTCTCAGCTTAAATTTCAATTTAAAGC
CCTGAAGTACATCTTCTAGTGTCACTTTCTACAATTTAACTGTCAACAAAGATTTTTATCTTTGTATTAGATTCTACTCAA
ATATTTAAAGAAAACAGATTCAAGGTTTAAAGATTTTGTGTTTGAATTTTGTGTTTAAATAGACTGATTGATTTTCACTGT
65 CTTGAGGACTATTGTGCTGCTGCTTCTACTACAAATCTGGTTCGTACTTTAATGTTTGTCTTTTAAATATATACATGAAAA
GCCAGCGTGGTGGCGCAGCCTTTAATCCAGCCCTTGGGAGGAGAGACAGGTGGATTTCTGAATTCAGAGCCAGCCTAGTCTA
CAGAGTGAATTCAGGACAGCTAGGGCTACACAGAGAAACCTGTCTCAGGTATTGAGTTTAAAGTTATAAGAGGCTAAACATAAA
ACTGTAATATGTTTTTAAAGTTTAAAGTAACTTTTAAAGTAAAGTTTAAAGTAAAGTTTAAAGTAAAGTTTAAAGTAAAGTTT
70 ATATTTAAACCTTATTTTAAAGACTTAGAGAAGGGATCATTTGATACATTACATATTATACACATACACATGCACATATCAGAGC
AAAACATACGAAAATGATAAGATTTTGGAAATCTGGGTAAAGAAAATAGTTTATGTAGTGTCTTGGCAGCTGTTTTTAA
TTTGAATTTCTTTCTCCCCCTCCCTTTTTTGGAGACAGGCTCTTTCTTACAGCCCTGGCTGTCTTGAATGCACCATGTAGAC
CAGGCTGGCTAGTGTGGGATTATCAAGATAAAATTTTGAATAATTCACACAGTATGACAATTTGATAATCAACCACT
GCTTCCAGAAAGAAAAAATACACACATACACGCACATATGTTGTTCTGTTGTTTCTATCTCTCTTCTCACTTGATAAAT
TAAAGTTGATACAGCTTCACATAAAATTTATCATTTCTGTTTTCACTGTTGAATTAAGTAAAGTTATGTTGAAGACATAAC
75 ATACAGTTGATAGCTTCAATAAAATTTATCATTTCTGTTTTCACTGTTGAATTAAGTAAAGTTATGTTGAAGACATAAC
CATCCCATAAACACCAACCAACCAACCAACCACTATTGCAGATGCCAGCAAGAGCTTGTGACAGGAGCCTGATATAGCTGCTCCTG
AGAGGCTCTGCGGCTGCTGGCAATACAGAGGTGATGCTCAGGCTCATTCATTTGAGCAGAGCAGGCTCTCAATGAAGGAGC
TAGAGAAAGGACCAAGGAGCTGAAGGATTTGAAGCCCATAGGAGGAACAAACAATATGAATTAACAGTACCCAGCTCTCC
AGGGAATAAACCAACCAACCAAGAAACACATGGTAGGACTCATAGGTCCTGTCATATGTAGCAGAGGATGGCTAGTTGGTCA
TCAGTGAAGGAGAGGCTTGTCTCTGTGAAGGTTGTTGCCCCAGTATAGGGGAATGCCAGGGCCAGGAAGCAGGAGTGGGGG
TTGGTGAAGTGGGGAGGGGGAAGGATGGGTTTTTGGAGGGGAAACAGGAAGGGGATAACATTTGAATGTAAATAAGAA

513

[illegible]

515

516

517

5 GCTTGCTGACAGGAGCCTGATATAGTCTCTCCTGAGAGGCTCTGCCAGTGCCTGGCAAATACAGAAGTGGATACTCACAGTCATC
 CATTGGATGGAGCACAGGATCCCAATGAAGGAGCTAGAGAAAGTACCCAGGAGCTAAAGGGGTTTTAGCCCATAGGAAGAGC
 AACAAATGAACCTAACAGTACCCCGAGCTCCCTGGGACTAAGCCACCAATCAAAGAAAACACATGGTGGGACTCATGTCTCTA
 GCTGCATATGTAGCAGAGGATGGCTAGTCAGTCATCAATGGGAGGAGAGGCCCTAGGTCTGTGAAGATTATATGCCCCAGTATA
 10 GGGGAATGCCAGAGCCAGAAATGGAGTGGGTGGGTGGTGGAGCAGGGGGAGGGGGAGGGAATAGGGAATTTTTGGAAAGGAAAC
 TAGCAAAATTTCAATTTGAAATTAATATCTAATAAAAAAAGAAATTAATAAAATCTTACATGAAAAGGCTAAACTAATCTGCA
 AATGATAAAAGATTTCTAGTGTGAGCTCTTACAGAGTGTCTGTATTGATTCTCTGAACCTGAATCTGATGTGCTTCAATC
 TTATCTCTGATTATAATTTAGAAAATAAATACTATCTTACCTCTGATCAGTTATAATTAATGAGTGTGTTTAAATTTTCATCCACA
 15 GGTTAGTGATTACGATGCAACCATGGTTCCTTGATTCTGTCTTGTGTTTTACCTTCTTATCCTAGCCAGTATCCGCTCAGCTG
 CTTATATTTTGGGTGAAATATGTCAAGATCAAAGGATGCTGTTTTGCCCTTGTACGACTGTTGCTGCATCAATAAACTTGTG
 CTTTATCTACTCGGTGGCGAGCTGGACTTGAAGGATACTCCGTAAGAACTGTATTTCATTAAATGTTTAAATCTCAATTTGCC
 AGATTGTTTTTATAGTCTCAGTTCCTTTGTATTGACCAAGTTTACTATACACTAGGTAAAAAGAAATCGCTTAGTCAGTAACAAAA
 CACAGTCTTAGAGTTACCAACAGAAATCCGGCTGACCGTAAGAACCAGTTATGCAGACATGTGTATAAGTCAGTGGTGCCATTTTC
 20 GTTGTACTACTACTGATCTTGTCTCTGGATGGAGTATTACATGTACAGCAACAGCTCTCTATCAGGTTGTACACTGTA
 GGCACAGTAGAGCGTTGTGAAGAGCGGTGAGTGCCTTTCCATTTCCATCGCAGTGAGACAACACCATCATCTTATGCACACAGAC
 CCACACTACACCATCATCTTATGCACACAGACCCACACTACACCATCATCTTATGCACACAGACCCACACTACACCATCATCTTAT
 GCACACAGACCCACACTACACCATCATCTTATGCACACAGACCCACACTACACCATCATCTTATGCACACAGACCCACACTACCA
 TCATCTTATGCACACAGACCCACACTACACCATCATCTTATGCACACAGACCCACACTACACCATCATCTTATGCACACAGACCCCA
 25 CACTACACCATCATCTTATGCACACAGACCCACACTACATTTTTTTTACATTCATAAACAATAGTTTTGATAGGTTTGAATAATCTA
 ATGGCAGCAAACTTGTCTGTTAATAGTAGTAAAGGTTACTAAAATGTGTATATGTTCAAAGTCAAATTTACTGTTTGAACCTT
 TTCTTCTTTTGTGTCATGGTTTTTGTCTCTTTCTATTTCAGAGATGCCAACGCAATATTAGAGGAACTCCCTGGCTACCCA
 GTGTCTGACTGAGATGATGAAGATAGTGGGAGGGCACTACCTGAAAGTCACGCTGAAGCCCGTTCTAGATGAGGTACAGAGTAGAC
 CTCACAGGCGAGCGCTGTGACCAGCTAGAGCAGCCTTCTCACTTGTATGTCTGAAAGGCCCTTTCACAGATCATCTGAGGCGTC
 30 TCCGTGTGCAGATGTTTACGTCTGATTCGTAACACAGCTAAATACAGTTATGAAGTAAACAGAAAGAGTAACCTTACGAGGGGTC
 ACCCAACATGCGGAGCTGTAGGAGAGGGGCCAGCAGTAGGAAGGCTGAGAGCCATGCACTAGAGCTTCTCTTTAAGAAAGTAA
 TGTGTTGATTAAAGGGTCTGTCCATTGAGGCTACTGGAGGAATAGGTGTAGACACTTTGTAAGTAAATTTCTTGGCCCTCTGT
 GGATTCATCTTACTCACAAGACACACTGATCTACATTTATGTTTGTAGATTTTTTTTAACTAGGATTTTGTATAGTTCTTTTG
 GGAATTTGTTTATGCTGCTTAAAGTTATCTTCAGGTGGAAGCTTAAATTTTGTAGATTTATTTTTTATAATATCAGAAGAAGAA
 35 GAATTTATTTATGCTGTTTAAATACCTAGGAAGAGAGTAACTGAGAAATCTTGTATATCCAGATATGTGAATCCTCGAAAT
 CCTGTGAAATAGATCCTGTTAAGTTGAAGAGGGAGATAATGTAGAGAATAAAGGTATGATTATACAGTGTCTATTATATCTAC
 ATTAATTTTTATCTTCATGTGATACCTGTCTCCATAAATGGTTTATTTTTATTTCTATGTATGAGTGTGTTGCTGCATGTATGT
 CAGTGTGCCATATGTGCTGCTGTTACCTGTGGAAGTCAGAAGAGGGCATTGAATCATCTGGGAATAGAGTTGAGGTGGTTATAAAG
 40 CATTATGTGGGTGCTAAATCAAACCCAGGTCCTCTGCAAGCACATAAGTGTCTTAAACCACTTAGCCACCTCTTCCCTCCCAAC
 ATATACTCTTAACTGTGCTTCTTGTGAAATTAATCATATATTCATTCTTTGCTAGAAAGTCTGAATTTAACTTAATAAATTA
 ACCTTAATGTTGATCGGCTTTAACTGAGTTGGGACTAGAAGCAGGAGACTCGAGAGTCTCTTCTAATAAGTCTCATACCCATT
 ATTTGTTCTCATGAAGATATTGAAGCTGTGTGACAACTAGTGTACTTGTGTTAAACCTGCAGGAGAACTGTACTA
 45 CTATGTGGACAAAGTATTCAATACAACTCGTAGGATCAAGTGTGAGCTGCCCACTGTGATGTGTATTTTTTATCTCTGAGGC
 AATGGCTGCTAAGAAATTTCTAGTAAGTGCCTTGGTATACCTTAATCACATTTTCTTTTCTATTTTTTCTCCATGCTGCTCAT
 TTGGTTTGTGTGAAATCTTGTGCATAGGTACAATCTCTGAGTTTTTCAAATGGTGTAGCTTCTTTGTGAGATTTAATGATT
 50 ATTTTTCTAGAACTCTCAAACATGCAATCTTATTTCAATATAATGGCACTATATAAGAGCTAATCAAATCATTGATTTT
 TAAGAAAGGACAGTTTGCATCTGTACAGTTTTCTATAATATGTAAGGAAATCTTTATGTGCTGATAGTTAAGAGATTGTAGAATA
 AACCCGTGTGTACCAGCTATTTTTTCCAGTTGCAGATTTTCAAACAGTAGTAATTTGGTAGTTTTATACAATTGACATAGATTGACA
 55 GCTTGAAGATCTAAGATGCTGTGGTGAGATGCTTTTCAAGAAATAGTCTTTGGCTTTACAAATACTTGTGCCCAACCATTAGG
 ATGATCTTGCTTCAGGTTTTGCAAAAATATCTATATTAAGATTTTGTCTTGAAGGCTTTATAAAGTTATGAGATCTACTTCTTAT
 TGTAGCACTTGGAAATCTCAAATTTTAGTTTCTTCTGTTACATAAATGAATTTGCCAAAACCTCATTGAGATCTGCGCAATA
 60 CACAGCAAGGCACTATTTACAATAATAATACAGGTTTATCTCTGCATAAGACTGAAATTAACCTTTCTTAGCCATCCAGAG
 ATTTTGTATTTCATTATGCTTCCATTCGTGACAGCCTTTATTTAATTCATCTACTAAGTGTACATGAATTCGGGTTTGGTC
 TCTTGGCTAATTACAATAAGAGATAAAACATTTAGCTTTAAATAAATATATCTAGTCTTCAATAATCAATAAGAGGGCAGAGACT
 TGAATTTGCTAATAAAGATGAAATAGCAATAGATTCTGTTTTCAAATAGTGAGCTAGATCATAAACCAATTTGCTGCTGTGTA
 65 GTCTGTCTTATCTTACTCTTAAACATGTTTGAACCATTAACCATTTGATTAGCCAATGAAACTGAGGTCTCAGTTGTTGTTACTA
 CCTGGAGCTCTGCTACCTGCTAGCAGGCGAGGAGCTATAATGATGGACAGCTTGACAGTTCCCTACTGGGTGATTGTGAAGAT
 AAACCCACGTCAAATCCGAGATTTCTTCCCTCACTGCCCTTCTCTGGCGTCTGATTGTTGGGTTAGTTGTTGACTCAGTCTG
 AAACAAGTCTGTACAATGAGTGTATCTGTCTACAGTAGCTTTCAATTCACCTGCACTTTATGTGAAATATTGGTAGCTTTAAAG
 70 TACTGTCTTACCTAATGCTTTTAGTCTTAAATTTGTTGGCTTTTCTTTTGTGACAAGTACATGAGAGAAACACATAAAAGGT
 AATTGTGGGTTATAGTTTCAAGAGCCTCAGTCCAACACCCACAGGCTCCGTTACTTTAGTCAGGCTGAGACAAGGCAAGCACT
 GTTACGGCATCTTGTAGCAGAGACCGCTTGTCTCCTGGCAGTAGGAGGCGAGAGAGGGGATGAGCCAGGGCCAGAAATACAC
 CCTTCAAGACATATCCAAAGTCTCTGCTCCGCTAATAAGCCTCCAGCTTCCACAGCCCCACACCTCGTACAACAGTCTATTG
 75 CAGTTGGAATCCGTCAGTGTGGTGAACGTTGATTAGATCGTGATCTAGTCATCTCTGGAACATTTCTACAGAAATACTCCAGATG
 GTGGTCTACTGGTCTTGTAGGCATTTTTCTATCTAATGAACCTGAATAATCAAGACTAACCATAATATAGCCTTAGACACCATGAAGA
 TTTTATAGGTTGAATTTAAACAAAAATATAAACTGAAAGCTAGTTTTTGGTATTCAAGTGTGTCACTAGGTAGTACTAGTAGGG
 CTTAATGTTACTTTTTTTTAAATAAATTTCAAGAACTTTTTATATCAAGAGCTATTTTTCAAATTAAGTATTTCTTTAAAAA
 CAGCACTTTGCTTTCCGTTTGTATTTTAAGTTACAGCATTTTTTCTCTTAGTTTAGCCACAGTCAGCATCATTTTCACAGCTCA
 GTTTTTACAAGTTATTTCTTCTACATAGTTTACATGATTTTTTTTTTGTCTTCTCTCTTTGGTTTATAAGTAGTGTGTTT
 GCATGACGTTTTCCATTTTATCCCTGCAGATCACCTCATGTTCACTGACTCTGCAGTGAGCAGCTTTGTCTTCTCTGTTTCTTTG
 70 CTGTAGGCTATCTACCTCATGCTTTTCTTGTGGACCTCATTTACAGTAAGTGTGTGCTCTCTCAAGGCTTTGTTCCTTTT
 TTATTTATTTTTTGTAAATGAAGAAGAAATATGCCATTTTTCTTTTTCGGTGATAAGACATTTACAGTTGGCAGAAATGCTGCTA
 AGTTGATGTCTGCTGATGAGCAGAGGGGAGCACTCCTCAGGGCCTTTCTCCGGCTGCTGCACACGGGCTCGGCTCTTAGTTACAG
 GGAGCTGGGATGCTGGGGTGGTAGGTGGAGTTGGGCTGGTTGTAGCCGACCTCTCTGGTTTATACAGCAGCTTATTTTTT
 75 ATTTCTATATTTCTAGGCGAGCTCTTGTCCATAGCCAGATGGACCTGACTCAGAGTCTTCTGCTCAGCCTCTAGAGTCCAG
 GAGTACAGGCATTTCCACCGCTCCTGGTTTACGGTGGTTAATCATGGCAGTATTTAAGATCTCAGAATGTGAAGGAAATGAA
 GAAGTTTATTTGAAAGTATTGAGAACCTGACTTACTTGGTATCTTTGTGCTTTTGTCTTCTGTTTCACTAAGTTATATCAAAAG
 ATGAGCTAAAAAGTCTGTTTCAAGTAACTTACCTCTGCGTTGAATATATACCTTCTCATTTTTTAAAGTTTCTTTT
 TCTTTTAACTATTTCTAGTCTTCTATATAGCATATTTTATGCTACTTTTGGTCTTTCTGTTTGAATATTTTATATATATCTC
 TTGATGCTTTAGCTGCTGCTGTGATCAGTAGAATAGGAACATTTAGTGATGACCTTGTCTAAGCTTTCTTGAATCACTTTCTA
 TGCTAACTCGCTTAGGCTTCTTAGTCACTGTAGGAGTAAATTAATTTATAGCCCATATACAGGTAAGGAAATCACCATGCAA

519

ATCAGACCATAGGTTCACTGCCCACTACTACCATTTTTTAAACAAAAAAGAAACACGACATTGGGCTGCATAGCTTCCATCCAGAT
CTGACCTCCCTCGGTGTTTACTCTGAGCCTCTGGAGAGCCATGAGCTTCCAGAGGCCCTGTTTGGGATTCACAGTTGCACTTG
TCAGGAGACCCCGAGGTAGATTTTTTCTTCTTCTAGCTTGTCTTTAGACCTGGAGTAATGATGGCTCTATACCTTATTGTTATGCTA
GTTAAACCTATCCATGCAATTTGTAAGTACTTTTCAAATCTCTGTTACATTTTCATTTTGTGCATATAATAATAACAAATTTAT
5 ATATGCAATGTTTAAATACATATTTACATGTATATTGGTCAGATATTTTAAACCACTCTTTGATATATAATTTTACCATTATT
AAAGACAAAATACAAATTTGCTACTACTAACGAGAAGGATATCTGTTTGTATTACATAAAATACGATGTGAATATTAGAGT
TGAGTATATAGAGCATCTTCAGTGTTTTTCAGAGTTGATTGTTATTTGATTTTGTAAATCATTAGTTCATATAAACATATAGTACA
AAATGGCAGAAGTATATTTAAGGCCATTTTTTAAATTTGTTGGAATTTTGTCTCTAATCTCAAGCTAGAAATTTACTAGTGTCTTCT
TGGTTTTTGGTTGGTTGGTTTGGGATTTATTTGTTTGTAGTAACTTAAGTCAGCAACATAAGCAATTAAGTCAAACTATTCT
10 ATATAAAATCCAAAATCTCAATTTGATACATGCTGCATTAATGATGTGGGAGAAATATTATAGGTTTTTGGTTTCTGTAATTAAGCCATT
ATGTTTTTGTGTAGACAAAAGCCTTCATGCTAGTAAATAGCTCAGTTCCTAGTATACGGTGGCCAGTGCTTTTGGCTGGAGG
CTTCAGGCGCAGCTAGTGGGATGTGTGATGTTTGGCAGTGCAGAGTGCAGAGCTTGTGGCGGTACCTAGCAGCAGAACACCC
CTCAGATTTGGACATGTTTGAATTTTGAATAGTTCTTGTGTTGTGCTTTAGAAACCTTTTGGTTGATAGTTTCTCATGACC
CATGTGAGACACGACTAATAATTTAAGAACTGTGCGTATTTAAACATACACAAATCCTGTATTTGTTTTCTCATGTGACGGTTCA
15 AAAGTCAGTCACTGTGTGAATTTCTCAAAATGTTTTCAGAAGAAAGATATTTTACAGATGTGAAAAAGGATGTGTTCTTTCTGTC
CTAGTTTAAAGAAATCAACATCTCATATTTCTCCAAAGATCCATTTCCAGCTTTAAAAAAATAAATCATGTGTGAATCTGTCAA
CCCTGAAGTCTTTTTTGGGTTGGAGAGATGGCTTAGAGGTTTAAAGCACTGACTGCTCTTCCAGAGGTCCTGAGTTCAATCCCAG
CAACCACATGGTGACTCACAAACCATCTGTAATGGGATCCGATGCCCTCTTTTGGCAGCTAGGGCATGTATGCTGGCAGAACCATGT
GTACATAATAAGTAAGAAATCTTTTTTTTTTTTTTAAAGCTCTTTTTCTCAATTTCTAAGATAAGCTGTGAGATTAGCAAG
20 TCTTAACATAACTCTGTAAAGCTTAAGCTTAACCTATAAATACGATTTCTATGCAACACTATTGACATTTGGGGCTAGGTAGTTATTG
ATTTTGTCATCGTAGGATATATGCAACCATCCATCAATTAATGTCAATGGCATATACCCGATTTTGAAGGCCAGAAATGCTTTTAG
CTATTACTAAATAGATGTCCCTGGAGGATGGAATGGCTTTGTTAAGAACCTTTGTTAGGAACTTCTAGGACTAAAGCCTAGTAGAGCTTGT
ATGTAGTAGAGTGGGTACTCACTTGGCATGACAAAGCAAAATGGGTACCAGATGGCTCAGCAGGTAAAGGGCATCTTAGAGGA
25 CCTATTGCTGGGGTCACAGTGATTGGAAGGAGGATACAGCTCCCATAGTTGTCTCCAACTCCATGTGTGTGCTGAGACACAC
ACATTTCAACATAAAGTCAGAAAAAATGTAAACAGTGTTTTCAATATAATGATAGTATGTCATGGTAGTAACTGGAAAAAATAAGTAA
AAATAAAAAATATAAATGCTCAGACATAAAATGTCATATAAGACTCAATAGATGTAAAGAGAGGTGATCAGTAGAACTAGAACTAGAA
GTCTTTTTAAGTCTTTAATTTTTTGGTCTTAACTTGTTATTCAATACATAAAATACATTTATAAACCTTGAAAACTTTGGAAC
AAAAAATATTCTAGGATATAGCTAACTAACTTGAAGAAAGATAGTTTTCGTTATCACAATCTTAATCTAGTGAACCAAGTTAG
CAAGCTAGTCTTAAAGCCTGTTGAGTTTCTATACATGATTAGCTGTGATGGCCAAAGAACCTTTTACTGAAGTACCTGTTTAG
30 ACTGAAGACATACTTTCTCGAAGACTCTATGAGTGAATAAGTCTCCATCAGATAGGGCTTGGTTTTGTTTTATTTTTACAGAGTCT
CAGTATATAGCCTTGCTATCTGATCTTGTAGTATGTAGACCCGCTGGCTCAAACTCAGAGTAGGCCACTGCCCTCTACCTCT
AAGTGCTGAAACTAATGGTGACACCACTATGTGAACCTAAATTTTTTCTCTTTAGTTGAAGCTTTTGAGAAAAATTTTCAATA
TATGCTTTTAATTTGTAAAAATAAATTAACAAGTTTGTATANN
NNNNNNNNNNNTACATTTACTGTCTCATGTATATCTGTAGTCTGAGGTAGCATTAAGATGTTTGTCTCAAAATCTTAATTTACTGCC
35 AGGCAGTGGTGGCACACGCGCTTTAGTCCCAGCACTGGGAGCCGAGGCGAGGATTTGAGTTTCGAGTTCGAGGCCAGCTGGTCTACA
GAGTGAGTTCTCAGGACAGCTCAGGCTCAGGCTCAGACAGGAAACCTGTCTCCGGGGGAAAAAATCTTGATTATCTTTGTGTGTGCCA
TGTGCTCTTCTGTCTGTCTATAGATCGGACCTAGGATTTACATATCTTAGACTGTTCTGTCTCCAGCCTCTATAATTAAGGAATT
ACGAGTGTCCATGTAACTCATCCATCTGCCATTTATACTAGTGACTTTTAAGTGACTCGTAATTAATACACGCTGTGGCCCA
CAGCATGAAAGGAAAGGTAACCGACAGAGTTCTGGATACAGAGGGGTTATGCAGTTTGGTGACAGAAACACAGCAGCTGTGAGGAG
40 TGAAGATGTTTACAGCTCTAAGTAGAGTGAATCTAAACAGCTCCTTACCTACAGTTTACTACGCTGAGTGGTTTACATCACAC
ATTGGCTTTATCTGTACTATCTTCTCATATAATGTCTAAGAGTGAGATATTCAGTAGGCCATTTAACTCCACTGGTGGATGGCCCAT
CTATTAGAATACAGATGAGACAGCATACTTGTGTTACTGTGCTCGATGCTTGAACCTGACCCACAGACAAAAAGGATTTCT
GTTCTTGGTTGTTCACTTACCAAGATTCCTTCCAGCAACTGGAAGGAAGCCTCTGAGTGAGTGCTCTGGTGGGCGAATCACAG
45 CACCACATGCGCCCGACTGTGCTGCCCTTCAGTCTGTAGGAGGAAGCACTGCTCCCTGTGATGCTCTTTATAAAATATTGCTTT
TGCTGTGTGATCTCTAACTCTAAACAAAAATTAAGTTTAAACAAAAAGGAGCAAGCAATACAGGACAGACATGGGAGCATAA
TATCTCTGGATAAGCAGATAGATAGGATTCCTCTTAAGAGGGGAGGTTGTTTGTGAAGTGCTGTTTCTCTTCCAGTGCTG
GGAAGCCGTGACTAGTCCAGCTTACATACTCATGAAGCTAAGTGTCTTTCAGTGAGTGGCCCTGTTGTTCTAGCAATGGATGCTA
CAAAATTTCTTGAGCCACTCTTATTTCTGCTAGAAAAATTTGTAATTTATATTGATTTAGTTTGGTTAGTCTATTGTTCTCAAG
50 TGTCCAGTTATATATATATAGAAATCAGCAAGCTATTTCTATGAATAACCAATGAATGGGAGGCTTATTGGTTACATAAGACCA
ATAAATCCTGTGATCTGTATTAATATCCCCCTTTGGTTCCATCCAGTAGTCACACAGTATTTATTGTCAGATGGAAAAAC
ACTGTAAAAATGATCATGAGAGCCTGTGCCAGTGTGTTGTCGAATCAAAGATGAGAGTTTAAAGGGAAGAAAAATAAGTCT
TTGAGCCAGGTGTGGGAGCAGATGCTTTTAACTCCAGCACTGGGATGTCAGAGGAGGATAGATCTGTGTGAGTTTGAAGCCAGTC
TGGACCACAGAAATGAGTTCTAGGCGCAGGCGAGGATACCAAAATATGGATAAGGGCCAGATGTGGTGGTATATGCCAGCATCTTAG
55 CACTGAGGAGGCTGAGACAGGAAGATTACAGTGTGTTGAGTTTCAGCCTCAGAAATAGTGAGACCTGTCTCAAAACGAATACAG
TTAAGGATATAGATGAGTTGATTTCTCTAGGTAAGTACATCAGAAATTTGAGTAAGTTAAGAAACATTTTGGCTTTAATCCCA
GCACTTAGGAGGCAGAGGCAGGCAGATTTCTGAGTTCGAGGCCAGCTGGTCTACAGATGAGTTCCAGGACAGGAGGTTATAC
AGAGAAACCTGTCTCAAAACACAGAGAGAGAGAGAGAGAGAAACAAATTTTGAAGACGCTTTCTTTGTAAATTTGGGA
CTTTGTATAACAAATGATTTTATCTATAGATTAATAGATGAGCTCTTTGATCAGAGGATCTTAAGATCTGAATCT
GCAATATTTAAAACTTCTTGAGTGGACATGATGTACAGTGGAAAAATTAACACTTTCATCTCAAGTGATAGTTCACAACTGCAGG
60 TGTAGTAAAAACAAACCTATATAGAAATTAACCTTAGGCTATGTATGAATTTTGTGTAGATATAGGTCAGGCTCCCCAGATACCT
TACTATATATGCAAAATGTTTCAGAACTCTAAATCTAAAGCACTTTGGTTCTAAGCAAGATTTCCAACTGCATATATATATATA
CTTTAGTAATAAGAAATTCCTCAATATAATCAGTGACATGCAAGATAAAAGTTTGTGTTTAAAAAGACAGAGTTTCTTGGTATA
GCCTTGGCTATCAGAAACTCATTGTAGACAGGCTGCTCAAACTCAGAGATCTACCTACTTGGCTCTGAGGTGCTGGAAATT
AAGGTGTGTGCTGCCACCACCTGACAGATAAAAAATTTTTTATAATATACCTTATTTACACACATGTAATACTTCCCCA
65 TCTCCCCATTAGTTTCTTGGATGAATTTCTATCGGAACTAAAGAGTCCAGTGGTACGAGTGAGCCTGTGCACCTGAAAGAAG
GGTAATTAACATAATGAGACATGAAGATTTATACTCATGTAGACAGTAAGTACAAAGAACATGCTTTGAGAAGAGGAGACCTG
AGTTTCTTCTGTTCCAGAGTCTCTAAGCGGCTTCAGCCAGGTAATCACTTCCAGCCCTGTGCTGCTTAGGACAG
ACACGCTGACTCATGACTCCAGGCTGTTCTGTAGTAGGAATGGCTGTGTTTCTTCCAGGAGGAGGTTGTTACTAGCAATAA
TGAGATGGAAATAACTTTCTGGCCCTTTTTATTCTGTATAGCAATTTCTAAACAGCATTACTTAGAAGAGGAGAGGTGCCTCA
70 CTCATGTTTAAGAGAGGTAGTGGCTCTGTAGAGGACCTGGGTTCAATTCAGCAGCCCATAGAGAGCTCACAAGCTGTTTGAAC
TCCAGTTCCAGGGATCTGATGGCCCTCTCAGATTTCCACAGCAATGTACATGTGCTAGATAGTCTATGACGCTACGCCATTCC
TAAAGGAGAACTAAGACAGCCCTGCATTGATAGAAGGACGCTCTGAGTCATCCCAGACGTCAGTCTGTGCACTAGTAGCCGTG
CATGGCCCGATGTCACCTAACAGTCAAGGTCAGTGTGTTTTCAGGCGAGTGGTTGACCTCTGAGGTTAAATGTTTCTGCTTC
TCTGTTATGTTGGCAGTAGATGTATAAGAGAGCTCAAGGAAGCCGTTTGAAGAAAGAACTTCAAGAAACAGATGTTCTGCTG
75 TTGACGAGCAGAGAGCTCACTTACCACAGACAGCAAGGTAGAGTTGTGCTTGGGCTTCGTTGTGGCTTTACTCTGCTGTTTCTG

521

AATAAAGATGTTCCAAGTGATACATACAGAGAAAACGCTGTACATCCAAGCAAACTGTGTGGAAGCCAATGAGTGGATAGATG
 TCCTGTGCGAGGTGAGCAGATGCAACCAACAGGCTCAGCTCTTTCCACCCTCAGCGTATCTCAACGGAACTGGCTCTGCTGC
 CAGGAGACGAGTGAAGCAGACACAGGCTGCAAGCCGTGCACCGCTGAGTAACCTCATGACTGCATGCGGGCGTGGGTGTGAGAGCA
 TGACAGACGCTATGTAGAGTAGCTGGACAGAGCGCGACGGTGTGAAGACATTTCTATAAACCGTGTCTAGAAAGCGTTGGGTT
 5 GTTGCCAGTGGTAGAGTGTCTCTCTCACCTGACACACAGGGGCTTTGGTTTAAATCTAGTACCACAAAATTTAAATACAGAG
 AGTAAGTAAATTTCTATAGACACAACCTGAAGTTAGTGGTGCCAGGGGCTAGATTGATGCATTGTTCCGTTGAACCACTATAGGTT
 ATATATATGTTTATTGGGACTGGGAGCAGTTAGTGCTTGTGTTCTTGTAAGAAAGAACTCAAGTTTAGTTCCAAAACCCATGT
 GACACCAGCTCCAGAGCACAGATCAGATACCGTCTTCTAGCCTCTGCAGAGGCATGTATAGGCACGCACGCATGCGCACACACA
 CACAGATATACATATACATTAAAAATATTTTTATGATTTTACTTCAAATCTTTTCAAGACTTGAGTCTTAAACACAGAC
 10 CTTGTGATCCTGTTG

MOUSE SEQUENCE - mRNA

ATGGCGGCGGCGAGCGCTGCTGCGGCGGCGGCTTCTCCCGAGGCGCGGCGCTCTCGGGCAGCGCAGACCCGGAGACGGGAGACGA
 GGACAGTCTGTGAGGTCCGAGTGTGCGAGAGCCTGCGCGGCGAGGATCTATGAAGCAAAAAATTTATTGCCATATCTTGGACCCAAACA
 15 AAATGCGCGATTGTTTCTGCACTATAAATTTGGACCAGGAAGAAGTTTATCGCACCAGGTTGTTGAAAAGTCTTTAAGTCCATAT
 TTCAGTGAAGAAATTTTATTTGAGATTCCAAGAACTTCCAGTATTGTCTTTTATGTTTATGATAAAAAATGTTTACAAAAGAGA
 TCTTCGTATAGGAAAAGTAGCCATCAAAAAGAAAGACTTGTGCAGTCTAGTGGTAAAGAACTTGGTTTCACTGCAGCCGATTG
 ACTCAAATTCAGAAAGTTCAAGGAAAGGTTACCTTGAGTTAAGACTGAATGAGCTGATAACAGAGAATGGAACCGTGTGCCAGCAG
 CTTGTTGTACACATCAAGGCCCTGCCATGGGTTGCCTCTCATAAACGGACAAAGCTGTGATCCTTATGCAACAGTGTCCCTCGTGGG
 20 CCCCTCTAGGAATGACCAAAAAGAGCAAAAAGTAAAGAAGAAAACAAAGCAATCCACAGTTCAATGAAGTCTTCTATTTTGAGGTAA
 CCAGATCCAGCAGTTACAGCAGGAAGTCCAGTTCCAGGTGGAGGAGGAGACATTGAGAAGCTGGAGATCAGGATTGACTTGTGG
 AATAATGAAAACCTAGTCCAAGATGTTTTCTGGGAGAGATTAGGTTCTGTCAATGTGTTAAGAAGTGATTCTTTTCAATCAAGC
 CTGGTACTTGCTACAGCCAAGAGACAATGGAACAAATCATCTAAAACCGATGACCTGGGATCTCTTCTGTTAACTCTCTGCTATA
 CAGAAGACTGCGTGTCTTCCATCAGAGTACTATGGACCGCTGAAAACCTTTGCTGCTAAAGTCACAGATGTTCCAGCCAGTATCCGCC
 25 TCAGCTGCTTATATTTTGGGTGAAATATGTCAAGATCAAAAGGATGCTGTTTGGCCCTGTACGACTGTTGCTGCATCACAATAA
 ACTTGTCCCTTTTATCACTGCGGTGGCCGAGCTGGACTTGAAGGATACTCCAGATGCCAACGCAATATTTAGAGGAACTCCCTGG
 CTACCCAGTGTCTGACTGAGATGATGAAGATAGTGGGAGGCACTACCTGAAAGTCACGCTGAAGCCCTGTAGATGAGATATGT
 GAATCTCGAAATCCTGTGAATAGATCTGTAAAGTTGAAGAGGGAGATAATGTAGAGAATAAAGGAGAACTCTGTACTACTA
 TGTGGACAAAGTATTCAATACAATCGTAGGATCAAGTGTGAGCTGCCCACTGTGATGTGTGATATTTTTATTCTCTGAGGCAAA
 30 TGGCTGTGAAGAAATTTCTAATCACCTCATGTTCTGACTCTGCAAGTGAAGTCTTGTCTTCTCTTCTTCTGTTAGCGG
 ATACTCTCACCTCATGCTTTTCAATTGCGACCTCATTATCCAGATACACAGACAGTTAGGACATTGACTCTCATCTCAAAAACCAT
 TCAGATTATTGGAAGTGGGGATGTCAAGTCCAGAAAAGTCAAGGTTCAAAAAGTCAGTCAATGTGTGAATTTCTCAAAATGTTTC
 AAGAAGAAAGATATTTTACAGATGTGAAGAAAGTTCTGGATGAAATTTTCTACGGAACCTAAAGAGTCCAGTGGTACAGATGAG
 CTTGTGCACCTGAAAGAGGTGAGATGTATAAGAGAGCTCAAGGAAGAACCCTATTGGAAGAAAGAACTTCAAGAAACGATGGTT
 35 CTGCTTGACGAGCAGAGAGCTCACCTACCACAGACAGCAAGGCAAGATGCAATTTACACTATTCAGTAAAAAATATTCTTGTCTG
 TGGAAAAATTTGAAGAAGGCTCTTTCAACAAGAAAAATATGTTTCCAAGTGATACATACAGAGAAAACGCTGTACATCCAAGCAAA
 AACTGTGTGGAAGCAATGAGTGGATAGATGCTCTGTGCAAGGTGAGCAGATGCAACCACAAACAGGCTCAGCTCTTTCCACCCCTC
 AGCGTATCTCAACGGAACTGGCTCTGCTGCCAGGAGACGAGTGAAAGCACACCAGGCTGCAAGCCGTGCACCGCAGGCATCCCTG
 CAGACATCCAGATAGATATCGATGAAGACAGAGAAACAGAAAGAAATTTATTCTATTTTACCCTCAGTTTACTTAAGCTGCAGAAA
 40 ATGGAAGAGACCTGTGGGTCTATAGCTGTGTATCAGGGGCCACAGAAAGAACCTGGTTATTCTAAGTTCACTTGAAGATTCTGT
 TGCAACCTTTAAGACAATTCAGCAAAATCAAAAGCACCATAGAGAAGCTCGATGAACCTCATGAGAAATACAGAAAGAAAGATCGA
 GTAGTGCAAAATACGGAAGCAAGGAAAATCCAATTGTGGGAAAAATATCATAG

MOUSE SEQUENCE - CODING

ATGGCGGCGGCGAGCGCTGCTGCGGCGGCGGCTTCTCCCGAGGCGCGGCGCTCTCGGGCAGCGCAGACCCGGAGACGGGAGACGA
 GGACAGTCTGTGAGGTCCGAGTGTGCGAGAGCCTGCGCGGCGAGGATCTATGAAGCAAAAAATTTATTGCCATATCTTGGACCCAAACA
 AAATGCGCGATTGTTTCTGCACTATAAATTTGGACCAGGAAGAAGTTTATCGCACCAGGTTGTTGAAAAGTCTTTAAGTCCATAT
 TTCAGTGAAGAAATTTTATTTGAGATTCCAAGAACTTCCAGTATTGTCTTTTATGTTTATGATAAAAAATGTTTACAAAAGAGA
 50 TCTTCGTATAGGAAAAGTAGCCATCAAAAAGAAAGACTTGTGCAGTCTAGTGGTAAAGAACTTGGTTTCACTGCAGCCGATTG
 ACTCAAATTCAGAAAGTTCAAGGAAAGGTTACCTTGAGTTAAGACTGAATGAGCTGATAACAGAGAATGGAACCGTGTGCCAGCAG
 CTTGTTGTACACATCAAGGCCCTGCCATGGGTTGCCTCTCATAAACGGACAAAGCTGTGATCCTTATGCAACAGTGTCCCTCGTGGG
 CCCCTCTAGGAATGACCAAAAAGAGCAAAAAGTAAAGAAGAAAACAAAGCAATCCACAGTTCAATGAAGTCTTCTATTTTGAGGTAA
 CCAGATCCAGCAGTTACAGCAGGAAGTCCAGTTCCAGGTGGAGGAGGAGACATTGAGAAGCTGGAGATCAGGATTGACTTGTGG
 AATAATGAAAACCTAGTCCAAGATGTTTTCTGGGAGAGATTAGGTTCTGTCAATGTGTTAAGAAGTGATTCTTTTCAATCAAGC
 55 CTGGTACTTGCTACAGCCAAGAGACAATGGAACAAATCATCTAAAACCGATGACCTGGGATCTCTTCTGTTAACTCTCTGCTATA
 CAGAAGACTGCGTGCTTCCATCAGAGTACTATGGACCGCTGAAAACCTTTGCTGCTAAAGTCACAGATGTTCCAGCCAGTATCCGCC
 TCAGCTGCTTATATTTTGGGTGAAATATGTCAAGATCAAAAGGATGCTGTTTGGCCCTGTACGACTGTTGCTGCATCACAATAA
 ACTTGTCCCTTTTATCACTGCGGTGGCCGAGCTGGACTTGAAGGATACTCCAGATGCCAACGCAATATTTAGAGGAACTCCCTGG
 CTACCCAGTGTCTGACTGAGATGATGAAGATAGTGGGAGGCACTACCTGAAAGTCACGCTGAAGCCCTTCTAGATGAGATATGT
 60 GAATCTCGAAATCCTGTGAATAGATCTGTAAAGTTGAAGAGGGAGATAATGTAGAGAATAAAGGAGAACTCTGTACTACTA
 TGTGGACAAAGTATTCAATACAATCGTAGGATCAAGTGTGAGCTGCCCACTGTGATGTGTGATATTTTTATTCTCTGAGGCAAA
 TAGCTGCTAAGAAATTTCTAATCACCTCATGTTTCACTCTGCAAGTGAAGTCTTGTCTTCTCTGTTTCTTGTCTGTAGCG
 ATACTCTCACCTCATGCTTTTCAATTGCGACCTCATTATCCAGATACACAGACAGTTAGGACATTGACTCTCATCTCAAAAACCAT
 TCAGATTATTGGAAGTGGGGATGTCAAGTCCAGAAAAGTCAAGGTTCAAAAAGTCAGTCAATGTGTGAATTTCTCAAAATGTTTC
 65 AAGAAGAAAGATATTTTACAGATGTGAAGAAAGTTCTGGATGAAATTTTCTACGGAACCTAAAGAGTCCAGTGGTACAGATGAG
 CCTGTGCACCTGAAAGAAAGGTGAGATGTATAAGAGAGCTCAAGGAAGAACCCTATTGGAAGAAAGAACTTCAAGAAACGATGGTT
 CTGCTTGACGAGCAGAGAGCTCACCTACCACAGACAGCAAGGCAAGATGCAATTTACACTATTCAGTAAAAAATATTCTTGTCTG
 TGGAAAAATTTGAAGAAGGCTCTTTCAACAAGAAAAATATGTTTCCAAGTGATACATACAGAGAAAACGCTGTACATCCAAGCAAA
 AACTGTGTGGAAGCAATGAGTGGATAGATGTTCTGTGCAAGGTGAGCAGATGCAACCACAAACAGGCTCAGCTCTTTCCACCCCTC
 70 AGCGTATCTCAACGGAACTGGCTCTGCTGCCAGGAGACGAGTGAAAGCACACCAGGCTGCAAGCCGTGCACCGCAGGCATCCCTG
 CAGACATCCAGATAGATATCGATGAAGACAGAGAAACAGAAAGAAATTTATTCTATTTTACCCTCAGTTTACTTAAGCTGCAGAAA
 ATGGAAGAGACCTGTGGGTCTATAGCTGTGTATCAGGGGCCACAGAAAGAACCTGGTTATTCTAAGTTCACTTGAAGATTCTGT
 TGCAACCTTTAAGACAATTCAGCAAAATCAAAAGCACCATAGAGAAGCTCGATGAACCTCATGAGAAATACAGAAAGAAAGATCGA
 GTAGTGCAAAATACGGAAGCAAGGAAAATCCAATTGTGGGAAAAATATCATAG

75

[illegible]

GCTGCAGGTTATAGTCTTCTTATTAAAGAGACAATGTAGTTTCTACATCATCTGCCATAAAGCAAGCCAATGTATGGGTTGAAAT
 GACTGAATGAGTTTAAACTGGTGAAGAAATAGGAAAAGACATAGTAGTGAATGGTTGCTCATCAGAACGAAGAGTGGTAGGGATA
 GAAGGGATGGCCCTTTAAACACATTCAATTAATAATTTAGGGAAGGAAGTGAAGTTCAAGTTTGTGATGATGCAATATTGTTCCAGTT
 ACTAAACATCATGAAGAAAAGAGAGGAAGTCTAGATGAATTTAAACATAATGCAAGGGCAATAAGGGGATGAGATGTAACAGCC
 5 TTCTCGTAATTATACATGTATGTCTTGTAGTCTTTAGAAAACCTTTATTTTCGGCCGGGCGCGGTGGCTCAGCCTGTAATCCCAGC
 ACTTTAGGAGGCTGAGGCTGGTGGATCAGCAGGTGAGGAGATCAAGACCACAGTGAAACCACGCTCTACTATAAAACACAAAAA
 ATTAGCCGGGCGCAGTGGCGGGCCCTGTAGTCCCAGCTACTAGGAAGGCTGAGGCAGGAGGATGCGATGAACCCGGGAGGCGGAG
 CTTGCAGTGAGCCGAGATCGCGCCATGCAATCCAGCCTGGGCAACAGAGCAAGACTCCATCTTAAAAAAGAAAAAAGAA
 AGAAGAAAGAAAACTTTATTTTCCAATATTTTATTAAGGAAACATTGACATTACCCAAGATCTCTTCAAAGTAGGCAAGTAT
 10 CAGTAAAAACAGAATAATTAGAAGTGACTTCGGATGAAAAAGCAATGGAGTTTGGGGATTTTAGTGAAACCGGTATAAGTCCGAAT
 CTGCAAAAGGAAGACTGTCTGGAAGAACAAAAAAGTGGAGTGTCCCTTATGTAAAAATTGTTTTCATACCTTTAGTGACCTTTAG
 TAACAGAGTTATGCACTTGGGGTTAAGCTAGTGAAAAGGAAGGAAGTTAGAAGATTTTGACACTAATGGACAAGATATTGATAC
 TTTGTCATTTGGATACGTTTGTCCATTGGATACATTTGTCCATTGTACATTGATACCTTTATCCATGGATACATTTGTCCAAAGGT
 15 TCAATAAATTTCTGTGTTTATTGGAGAAAGAAATAGATGGATGAGGCATCGCTTGGCCAAGCAGGAGGAAGGCAATCAGGCTGT
 GTGAGAAAAGGGGCTCAGTGTGGCTGGAGATCAGAGGAGTCAAGTACGCTGGATCCAGTCCCACTCTTGGCTGAAGAATTTGAAC
 TTTAGTCATTCTAGCATTTGTTCACTACCTGTAGTGTGCTCTTGTAGCTGGCTGAAGGGATAAATGAAGCCACTGTATGCTCTT
 GAGCAGGCAACTGATAAGCTCCATTTTGTAGGAAGTTAAGTTAAGTGGTATGTAGGAGGAATGAGAGGATGGGGGAACT
 ATTAACAGAGTTCCAGTCAAAAGCATGAGGTGAGTACTGAGGTAACTCTACTACGTGCTCAGCATTCCACTAGACACTTAACACC
 20 CTGCTCCCAATACCTTATTAATCTTAATAACAACCCCTTCAAAGAAAGAAAGTTAGCATTTCCTCTTACTGTTAAAGAAACAGGTT
 CAACCGGGCGCAGTGGCTTACACCAGCAGCTTTGGGAGGCTGACACGGATGGATCACTTGAGCCAGAAAGTTCAAGACCAAGCTGG
 GCAACATGGCAAAACCCCATCTCTACAAAAATACAAAAATTAACCTGGACATGGTGGCGCGCACCTGTAGTCCAGCTACTTAGGA
 GGCTGACATGGGAGGATAGCTTGAGCCAGGAAGTTGAAGCTGCACTGAGCTGAGATCGTGCCACTGCACTCCAGCCTAGGCAACA
 GAGCAAGACTGTCAAAAAAAGAAAAAAGAAAGAAAGAAAGAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
 25 TTGCCCCAATGTAAAAGGGGTAGAAACAGGCTCTATGTCTGATTCTAAAAAGGGATGCTTTAAAAATAAGGGGAAAAAAGCTCTG
 TAACACGTTGATACTCTTAAATGAGAATAATTTTAAACAGGGCAATGACAGAGAATGGAAGGAAGGAGAGATTTGAGCAGAGT
 CAGAAAGATGTGGCAACTGAAACAGCATTGGGCAAGGGGATAAGAAAAAGTCAAAGTTTCTGGCCTGAGTAAACAGTATAAGATGT
 GAACTCAGATTGTGAAAGGGGAGACAGGAATTAAGTTTGGACTTATGTTTGAATGACAGCAAAACATTATATAGAGGAAGTG
 GTTCACTTTATCCAACAGTGTAAAGATCACATGGGAAATAGAAGTCACTGCAACACAGGCAGAACTGGAAGCTTCGCTGGCCA
 30 GGTCCATGTTAAACTCTGACCATTTCTCTGGGCTGTCCAGCCTTTGACAGGCGGCGCTTTGTCTTCACTTTTCACTTTTCCCG
 TCCATTTCTTATCTCCAGTGCTCTGGCTTTTCTGTGCTCTCCCTCCAGAAATGAGCTGGAGCTCTCTTCACTTTGACCTTTGTG
 TAGTCTCTGAGGTCTGAGGCCATCACTATGTCTGACCTCAAAAAATATTTGTGACTGACTGGCTTATCTCTGTGTGCTGCTGG
 AAAAGAATTACCTGCCCGATTAAAGTCAAGTTTCTTCTTCTTGAAGGAGGAGTAAACAACTCAACACAGGAAATGTCTT
 35 CCTCATCATACACAGGTTATTATCATGCAGTTTACTCACTGTAAAGAGTTCCCTTGAATAAAGTCAACAAATAGTCAAGAT
 TACACATTTCTAGGGTCAAGTCACTTTTAAACAAAGCCAATTTTAGTAGTGGTGGCGGTGGCGGGGGGAGCCCTTCTTGTCTT
 TTTCTGTTCTGAAATACAAAGTGTAGTGAATGCTTCAGAAATTTCTATGAGAGGGTCTCAGGCACTGCACTCAGCTGGAGT
 TGGGGGTGGCTGGCTTTTCTGAACAGGTTTTCAGAGAATGGTCTTAGTAAAGATATTGTGTGGGAGGAGTTTGGCTTG
 CTGGCGGGGAGTATTGGATAAATCTGGAAGAGCCTCAATGCTATCTTGTCTCTTTGAATAAGATACTTTTGGAGTCCACCC
 40 ACCTGCCAAATTCATTTCTTTCTCCACAGGGAGTTTCCCTGATTGGGAAGGGCTGTATTTCCCGGAGCGTTAGGAGATG
 TGCAGTCTATTCTTGGGGGAGCCCAATTCCTGGGAGGATTAGGGATCACGGGAGGGCGGGGCGTTCTCTGGTGGGATTTT
 AAGGCCGTCTCAGAGCCAGACTGGGAGCTACCTTAGCCAGCGCCCAAGCCGGGAGTACGGTTCTCTGAGGGTAGCCCGGCTCG
 GGGGTGGCGAAGGGCGTGAATGGAGACCCGGGGGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGG
 45 GGCCCGGGGGCGGGGCGAGCGCGCGGCTGGGCTGGGCTAGGCGGCTGCTGGGCTCGGCTCGCCCGGCTACGCAAGCGGCGGAGG
 GTGCGGCGACCGGCGGGGCGGACCATGGCGGCGGCGGCGGCTGCTGCTGCGGCGGCTTCTTCCGAGCGCCAGCGGCGGCTGCGC
 TGCAAGCCCGAGGCGGGGACAGGACAGTCCGAGGTTGAGTGTTCAGAGCCTGCGGGGCAAGATCTGTAAAGCGGGGCTGG
 GCTGAGGGGACCCCTGGCGGCTGGGCGCGAGGCTGAGGGGGCGGGGTTGCGGCGGCTGGCGGCGGCGGAGCTGCGCTGGGAT
 50 GTGGGCGGGGCTGCTGCTCTCCGAGGAGTGGGAGCTGGAGATGGGCTGGGTTGGGAGAGCCGGGCTGCGGCGGCTGAGG
 GCTCGGTGCTGGGAGCGGCTGGACGCGGGGACGCTGAGTCTGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGGGGCGG
 CGGCCCGCTCAGACTCAGGCTTCCGCGGCTGCGGCGGCTGGGAGTGGCCCCGCTGGGAGCGGAGCAATATATACGGAG
 GCGCGGCCCGAGGAGTGGCGGCTGGGAAGTGGGCTGGGCGGAGGGGAGGGGGCTGTGCTTCTGGGCTCGGCGAGCTGGG
 55 AGAGGTTGAAAAGGCGCCCTGAGCTGCAGGAAACGGGCGGCTTGGGGCGGAGTGGCTACCGCGGCTGTTTCCGGGTTGAGC
 GACTAAAGCAGGATGATGAGGCTTCTGTGAGCAGGTCTCAAAACCAATCACCAGCGGCACTCAGCCGCTTAATTCCTCT
 CTCTCATGCGTGAATGCTACTTTAGTGAGCGAGCTACAGTTGACTAAATACGAAATTTGCTCAGAGTTGCTCCGAGCATT
 CTGTGGACAGATTTATGAGTCTGTCTATTGAACATTTTAGTTTTAAAAACGACCTTTTGGTGTGAGTTGGCATTTTCTTTTCT
 60 ACAGTGGTTTATTTAGATGAAGTCTTTTGTCTTGTGTTGAAGAGAGATCAATAACATTTATTTTGTGCGAAAATTA
 GCATTTATTTCTCATGCAGTATTCTCAGATTGGAACATGCTTCATGTTTCTTATAAATAACCTCAATATGAGGGCGTACTTT
 TCACTTTGAAGAAATGACTTGCATTAAAGTGGCTAAACATTTCTTCTGGGAGGATGAAAATTTCTCTCTCTAATACCA
 GTACTGTTGAGCTCAGATTTCCCACTTTCTCTTTTTCAGGTGGTTCACTATTTGGGATTTTGAACCTCAGAAAGCAGAT
 65 GTTAACTTTCTTATCTTTTATTCCTGAGGTAGTCTGGGCTCTTAAAGATTACAGTTCTTAAACCTGGAAGTGACACCA
 GAGAGGTAGATCTAGTTCCCAAAATTAAGTTACTTTCTAGGGCATAAAACCTTTTCAAGATTCAGATTAATTTTATTTATTT
 TTTCTTTTCTGTAACCTTATATTGAGGGGAAATTTATTTTCAACTTTTGCAATATCTAATTTAAACATTTGGGAAAACCTGTA
 AATGGGCCAAAGTTTCTCCCTTTATATGATTTTCCAGATTTTACCATTCTTAGTGCCACTGTATGCTAGGCATTGTCTATTGG
 70 AGACTCACTGGTACGTAATGCAAGTTTACCATGGAATACATATACATGCTTGGAAATTGAGGGTTAGGGTTTCCAGAGGA
 CTTAGTTGCTGTGCTTTTGTCTGCCCCATGCCAAGACCATAAGAACAGTTTGTAAAGTGAACCTGGGTCTACAGCTTAAAA
 AAAAGAAAACAAAAACCACTTTGTTTCTATGGTTAAAGCAACCTGGCTTGGAAATGATCATCCAGCTGTGGGAATGATAT
 TACTGCTTAAACACAGTTGAAGTATTCTATCTGTTATCTAGTCACTTCTGCTTTTAAATTTGCTTATCTTATAGCTCAGGTT
 ATGGAGTGTCTGCTTTCTAGAAAAAAGATGATTTGTATACTTATATACAGAGCTCTCTTCCATTTCTTGTCTCTCTTTTA
 75 AATGATGTAATCCACAGTTGGTTGACATTGAGAACCTGTGGAAGAGATGCTGTTTCTGTTTCCCTGAAACTAACATTTAGCCTG
 GTAGGGTGGGACTGAGGGTTGGAAGAGTCAATAGCAGGTGTCAAGGTCAAGAAATGAGATGGTGGTGGTCTGACAGATATT
 AAGCAGCTTGGGAGGGTGAACCGTGTGAGCTTTCTCTTACCACAGTAGGAAACCTTGAAGAAAGCCTGATAGTGCCCACTA
 GGAGATGTGCTGCGAGATTTATACACTGATTTAGAGAGCTTTTAACTGCACATCAACCCAGTGAAAGTGAAGGATGGATTATGTA
 AAGAAATTTTCTTATTTCTGAGCTTGCATAGGACTTTTAACTGCACATCAACCCAGTGAAAGTGAAGGATGGATTATGTA
 TCTTGAATGTTCAAGAGATAATAGTCCATAACCTTCTTTAGGGATTTCATTCTGTAATTTTCCCTTATCTTCAAGGTGA
 AATATCTGTCAGTTGGACAGATATTGTCTCTTGGACAAGAGGAACTTAAACAAAAAGTGAACAAAAAGTGGAGGTCAAAA

ATAACAACATGAGACCTCAATATATATAAAGGATGAAGCCCCAATACCCCTTTTTTGCTTGAGTGACTTTTTTTTTTTTTTTTTCG
CGGGGGCTGGGGAGGAGGAAGAAGGGACATGCAAAATATGTTTCAGGTGTTTATATGCGCTCAAAACGAAACCCAGGGAATTCGAG
ATCCATCTATAAGACAAAATATTTGTCAGCAACCTGGATTGTCGAGTTTTCGCTAGGAAACCATGACAGTTCTGAATTTGCTGCTG
TTCCTTAACTTTTTCAAGAGGTGAGTTTGGTTGTTGATATCCTAAGGTTGTCATATGAACCCCTGATAAAGGAAATAGGGGTG
TACTCGACTCCATTCTTCGGTCTGCACTCCTGTGTAGCGAGTAGCAAGTATGCTAGAACACCTGAAACACATTGTCATGCTCCCTC
CTCCCTCAAAAAAAGGAGGATTTGGGGCTTCTCTCTTATGTATCTTCAGGCT
TCATGCTGTTATTTGGTGACCTCCTTTTTGATTAGCACTTGTTAAGTTTCCTCTTATCCAATTACATTAGATTGTAAGGATTTGTC
GGAGAGCACCATGCGACCATATGTGTGGCTTATCTACTCAAGGAATACCAGATCAATAAGAGAGCCAAATGGGAAATTTTGTG
TGAATTTTCAGATGTGTGTACAGTGCAGATCTGTGGGACTATGTGTTCCAAACTCACTTAGTTTCTCTGGTGTCTTCAGACCA
AGAATAGCTAGGGTTATTTGACAGAGTAGGGAAGATCTATAGGGTATGGTTAAGTGCTTGAGCTTAGAGGCTGGGTGAAAGGTT
AGTTACCTGGGTTTGAATCTTCACCTAATTTCCAACCTTTGTTAATGCTTTGGGCTTCATATTTCTCATATATAAATGGGGATA
GTAAAAATACCTATCTCACGGTTGTTATGAGGTTAAATAAGCCTCCCTCCCTACTCTGCCCTCCTCATCTCTGCCTGCTCTTT
CTCCTCCCCAGGATCTGGGTCTACACCGACCATCTCTTAGGAAGGAGTAAAGTAGGAGATAAAAACTAATCTTCATCTGATGTT
CTTGTCACAGTATCTGGAGTTTCCAGGTGTACAAAGCTGATTAATAAATCTGAAGACCTATATCTCTTTAAAGCTGTTAAATTA
ATCTTCATATGGCGTTAGCCAGCTCACTTATCTTGAAGCTTACCTTCCGCATCTTTAAATGGGAATGATGCTTTTCCACTATCCA
TTGTATACAGGTTGTTCCCTCTGCTTGGGATGTCTTTCTCTTACTCCACCCCATCTTTATGTAGGGAAGCTCCTACTCATCCC
TCAAAAGCCTGCTCTATGTGATCTCCTTCCAAACCTTCTGAGACACTTCCAGTGCCATCTCTGCCAGCATCTCTGCTGCTGGG
GAACACAATTCCTTGCTCATTTCTTATTATAGCACATTTTATAGAAATCATTGTTCACTTCTCTGTTAGATTGTGAGCTCTTT
CAAGATAGAATTGATTCTTGTTTATTTTAAAAATCATCCAGTGTGAGCAATGCCTAGAACAGAAATAGGCTTTAGAAATATG
CCCTACCTCACAAATGTTATCTGTGGATAATTACTAGATATGAAGGATTTATAAATTATATACCTTAAAAAATCTAGAAGGTGTT
AGTATTAAAGAGAAAATCTGATGAGTCTGCATCAGGAAGTTTATCCCTTTCAAAATCAGAGTCCCACTAAGCTTAGGTTTGAATG
ATGCCAAAGTTGCCCTGTTAGGAAAAGATTAAATTTTCTTAATGCTCTGATTACTTATTATTAGGGCATTGAAATATTGTTACT
AATTGGTCTGGAGCTTGGAAAAGAAAATCTCATATTCATCTTTACACATTAAGTGTGTTAATTGACATGACAGGTTTGAATAA
AACCGCTTATTTAATCTGTGAAGTATAAATGAAAACATTTTATGACTATCCAGTAAAGTTGAGTGGAAAGAGATTAAGGAGGTT
TATTCATGCTAAGAGTTTATTTTATCAGATATTGAAATGAGATGATGAGTTATTAGGATGGAGGAAGAAATCCATCTTTCAGAT
GGATAGAAATGGGGAGAAAAGGGTCTTTGTAAGGTTTACAGAGCAGTCTGCTAATCATTGCTCTGTGGAAGACGGGAGGTAA
ACCTCAGAGGTTTATAGAGTTGTTTATTTTAAAGCTTAGAATCTTTGAAATAGATCCTTAAAGTGAATAATGAGGATTAAGC
CATCATTTTATCCTTAAATCATAGCTGCTAATCCTATTCTTGTAAATGCTTTATGAAATATTGACAATATATCAGATTA
CATGTTTTGCTACTAATAAAGTTCTATTCTTTTGAAGTCTGCAACAAAATGTTGTATAGTCATATATTATGTAAGTTAAGC
TTTTATGTGATTAAAGACATTTTATGGCATCTCTTTAGGTTGTTATGTAATTTTATGTTATCAAAACCCCTATCTAAAGTGATA
AACATTAAAGTTTGTATCAGTACATACAGAGAACCATAAATGACAAATTTGTTTTCTGTCTAATGACAATGACTTTGGGC
AAATCTTTAAACCTTGTGAGCCCGTATTTCTTACTTGTAAATTAGAGGTTTGGATATGGTCTTTAAACATCCCTTCTACCATTT
TGATTATTGCTTTTAACTTGAACCAATTTGCTTTAAGGCAGTACATCAGATGCTTTATTTTAGTGTTTAAAGTATTATGATACA
TGTTTTGCTGATTCTCACTGTTTTAAAAATATTTAAGATTATTAGATAAGAGCGTTTGAATTTCTAAATTTTTTTCTGTGACTGTT
AATTAATCAGCAGCACGTAATACATATCGAAGGCTCTGTTAAGAGACGCTAACCCACTGGAGTGAATGGGCTAAGCTGTGAAT
CGGATGAAGATCCTATTTATCCTAAAGTCTATACTAAGCAATAGCTGTTTTAGACATCTGATTCTTAGACAAATATAGAAAT
TAAAGCTGGAAGGTAGAGAACATGAAGGTAGAGAAAATTAAGGTTCTTACCCTTCAATTTTACAAATGAAGAATCTAACAGAGACA
GCAAGTGTACACAGTTGATGGCCTGTTCCGCACCTAGTCCATATTATCAAGTCTCTTCTAGAAATGCTATATGAGATTAACCTAT
TACTATGAATGTTGCAATGTAATTAATACACAGAGATTATACTACTTATCTGTTTATATATTGAGAGGTGGAAGATT
CACTGTGCGGTCTACACACTCTTAACTGTTCTTCTTAAAGAACTTTGGAAGTGGTTAGGATTAGTGAATGAACTATGGTTATGAC
CTAGGTGGAGATTGAACCTGGATGTTAGTTACTTGTGCGCATGGTCTACCTCAGCTATTTTCACTTCTGACTGTCTGTCAACATCA
CCTGTGAATCAAAAAATATGATGCCAGACTGTACCCAGACCTACTAAGTCAGAAATTTCTGGTTTCAAAAGTTCCATAGGGGG
TGATGTTGGGCTAGGATAGTGAATTTCTGCTTTTGTGCAAAATAGATTAGCCACATACCCCTACCTAAATGATGGCAACCTGT
GTGCTATCATTTAAAGGTATCAGTAGAAGGTTGGTATAGTTACAGTGAGATTTTAGTTGTTTGCATATATATTGATGTATTA
ATTCTATTTAGTATGATAATATGAACCTTGGTACAAAATCAAGAGGTACAAAACAGTATATACATTGAAAAGTATTCCTTCCTT
TCATTTCTTCTAGCATTCCCTCCCAAGAACGAACTTACCAATTTGTTATATCCTTTTGTGTTGTTTCCAGAAATTAAG
GCATTTACAAACATAAATTTATGTGCACTAATATATTCCTTCCACCAACATACAAATATAGCAAAATATATACATTTTCTGTAT
CTTGCTTTTTTACACTTAAACACATCAGCTTGAAGATTTTTCACATTACATAAAGAGAGATCTGCCTTATTTTAAACACCTGC
ATAATATTTTATCATTTTGGCTGTACCACTGTTTATTTAGCCAGTCCCTTATAGTTGACACTTAGGTTGTAACAGCTAATGCTAT
TACAGACATTACTACAAATGAATTAACCTTGTAAAGCATGTCAATTTTAAATAGAGTGTCTTTTGTAGGATACATTTCTAGATAGATG
TTAAATTTGATGAATTAAGGATATGTGCATTTTATTTTGAAGAGACAAATGCTAAACTATAGCAATTTAAGCTCTCACCAGCAATG
TATGACTGCCTATTTCTTTATACCACGTAAGGTTGATTTTAAACCTTTAATCTTTACTGGTCTATGAATAAAGGAAACATT
TAATTTGTAGTTTAAATTTGCATTTTAAATGAGAGTGAGGATTTGCTGTGCTCACCAGGGCAGATCTTGGCTCACTGCAACCTCCG
CCTCCCGGTTCAAGCATTTCTCTGCTCAGCCTCCCGAGTAGCTGGGATTACAGGCATGTGCCACACGCCAGCTAATTTTGT
TATTTTGGTAGAGACGGGTTTACCATGTTGGCCAGGATGGTCTGATCTCCTGATCTCGTATCTGCTGCTTCAAGCTCCCA
AAGTGTGGGATTACAGCCGTGAACCACTGCGCTGGCCCTAATTTTAAATTTTAAATTTTCTAAGGCTTGAAGTTAAGTTATA
GGATCTCTTCATATTTTAAAGGCCATTTTGTATGTCTATGTGAACCTGGTCTATTTCTTTTGTCTTTTCTGGTGAGT
TACAGTCTTCTGATTTGTGAGAAAATGCTTTATGCTGTGAAGGAAGTTAGCTATTTTAAAAACCTGTGCAAGATTTAAAAAT
CTGTATACCTTTGGCTGATGCTGAATTTATCTTAAAGTTGTTGTGAGATCCAGTGAGGGCAGTCAGTTGTAAAGTTTCTACTT
ATATAACGCTCTGATGGTTGAGAAATGAGAAAGAACTGCTTGAGGAAGGTAAGTGAAGACTTATAACAAAAGTTAAAAAGACAAT
AGATTGGGAGAAAATTTTGCAGTGTATCCTTCAGACAAAGGAAATGTGTATAACACTGAATTTCTTCCAGGCCTGTTTTAAAG
CACTTTATGCTATTAACTAATTTAATCCTTACAGTAACCTTAAAAATACCATTATTATCCCATTTTACACATTATGAGGAAACA
GATACACAATAGCTAAGCTAAGTAAATGACCAAGGTTAGATGGCTGGTGAATGGTGGAGCTATCAATCAGACTGGGAGATTGGC
TCTAGAGTCCATCTGTTAACTCTTAACTACTGTGCTATTATGCTCTCTATTATTATGCTCCAGATTATATAAATTTATATAC
65 AGACTTAAAAACAAGAGGCCATTAGAAAAATAAAGGATACGAATAGGCATCTCACAGGAAGGAAATACAAATGTCAGTAACAT
GAAAAATTTGGTAAAGTAAAAATTAATCAGGGAAATAAAAATTTTAAACATCAATTTACAAAAAAGGAAAGTTTATCTCAGTCTT
TGGTGAGGTTTAGGGAATAAGTATTTTCTCATTTGTTGTTGAGTTTAAATTTGATAAAGCAATGTTGGAGAGCATTTTGGCTA
TATCTGTTAAGAATTTAAATGTCTATACACCATGCAATTTTACTTCTACCTATTGSCCTGCATCAACAGTTGTACATTTAGAGAA
GAGGCATATACAAAGATTTCAATGTTGCTTTTGGTAAAAACAGAAATAATGGAGACGACTTAAATGTACATCGGTAGGAAATG
70 GATAATATGTTTACACAGTATTCTATAGCACTAAAAAGAAATGAGGTATATCTATGTTATGAAAGGAAAGAACTCCAGGATGTCT
TGTGGGTAAGAAACAGCAAGTTGTGAATAATATGTGTAGTATCCTGTGATTGTTTAAATCTCAAAACATTTTACTTTTCTGCA
GTGTAGATGGATAAATACATAAAGAGGTTGAAACAGTTGTACAGATAACAGTGATTCCTCAATGGTGGATTAAGGGAGTTAGCC
GGTGTCTGGGAAACTGGCTAGGCATGTGTAGAAAGCTGAACTGGAACCTTCTTACACCTTGTACAAAAATTAATCAAGATGG
ATTAAAGACTTAAATGTTAGACCTAAAAACCGTAAAAACCTAGAAAGAAACCTAGGCAATACCATTCAGGACATAGGCATGGGCA
75 GGACTTCATGTCTAAAAACCAAAAGCAATGGCAACAAAGCCAAAATGACAAATGGGATCTCATTAACTAAGAGAGCTTCTGCA

526

TTTTGAAAATATATATCATTGAGAGAGTTATTTGTGAAGATTAAAGTAAAAATATATATGAAGTCAATGAAAAATCTGTGTAATA
CATGTATTAATTTATTAGTAAGTGGTAGCTATTATTATGATTGGCTTTCTGTCAACCCCAATATCCTTAACCTTTGGATCATCT
TGTCAGGACCCCTGGCTCTTTGCAAGTTTCTTAGGGGATTAATCCCAGTGGGACCCATGTTGGCGCCTACCCTTGTTACTTCAGGTA
ACCTTTGAAGCAGACCTGGACCTACTACATCTCTTCAGATGGGAATAGTTTCTCAGCACAGCTGTATTGAGAAAGCCTTAAGAG
5 TTGAATGAGAAGACTCTAGGCTTTGGAGTTTGATTATGCCAGATAACCTTACCAGCTATGTAAGTGAATTTTTTTTCTTAATTT
ATGAAAGGGAATAGTAATGCTTATCTCAGAGGTTGTCTACCGATCAATGAAACATTGAGAAAAATTTAACACTGTCTTGGA
GCATCTAACTACTTAATAAATCTTATCTCTTTCTGCTTATCCCTGTAGTGTCTCCCTAGGACATGAAGAACATACATG
AAACCTTCAGGTATAAATGCATGCACATAATCCTCAACATCCACATAGGCACATAGGTACATACTCACATATGTACATACTCACA
10 TACATGAACAGAAGCATATACATCAGAATCTCTACCTTTGATAGTAGCCTGATATTGGAATTTTTGTCTAGATAAAATTTATATG
GTAGGATTTGAATTTACTGTCTGATGACTGTTACATGGAATCATTGATCTTGATACATAGAGAGTTGGCTGTTTTCCATTTCTGT
AATCTTAACAGTTTGTATTTGATGTTTATCTTTTCGCGCTTAAACTATTACTTTTTAACAAATATCTAAAGAGCTGCTGTTTT
TATAGTTACATGTCTCTCTCTTTTTCAGGTATTTATGCAGAGTTACTTTCTCAATGAAGCCTTCTTGAGCTACCTCAATTTCT
TGTTGGTGGCCATCTATTAGTATTAGGCCATACATTTTACTTATTTATCTTATTTGTGTCGATCTCTCCATGTGTGTAGCCCT
AATAAGGACACAGACTTTTGTCTGTTTTGTCTCAGTGCATATCCTAGCAGCTAGTAGGTACTCAGTAAATATTGAAATGTGTA
15 ACTTCAGCACTGGTTTATTTTCAAAACGCTCTGTATTAAACAATAAAGATTCTTAAAGTCTTTTGGTAAGTGTATACAGGAGA
CTTTTTTAAAAAATCTTTGGAGTAGTTGACATAAATCACTTAAATGAAATGAAAAAAGAAGTTTACATACAAATTTATGTTTTGT
GATGTGGTATTGGAACCTCTTTTTCGCCATGCCAAGTTATATACACACGCAATTGATACTTATTACAGCAGTTTCTATATATA
TTTTATGCTAAGGATGGTGAAGATTGGTCCCTTCTCAAGAAGTTTATAGTTCAAGTGAAGAGACAAACAACTGCTTTTGTCT
TGTTGTGTCTCATCTTTTACCACCTCAAAACATTAGAGAGCCCTGAGGCTCAGTCTTCAATTTCTTTCTATATTGCTCCCAT
20 GTGATTTGTATTGTCTCTGGTTTTGTAAATTTTATGTAATTTTATGTAATTTTCTATCTAGGACCTTTTGTCTGTC
CTTGGACAGATTGTCTGCACTTGGATGTATAAGGCATCTCAGATTTAATATTCAATACAGTCTCTTGAATTTGGTCCCAACAAGA
GGCTGTGTCTTAGAAATAGCATCTCTATTCATCCAGCTGCTCAGACTAAGACTCTTAGAAGTCATTCTGACTACTCTATTCTCT
ACACCTGCAAGTAACTCTGTGGCTCCATCTTCAAAATACATGCCAAATGACCAATCTCTCCAGACCCGTGTCTGCTCTGCCCC
25 CTCCCTGACCTGCAAGTTTTCGCTCATTGAGATTACTCAGTAGCCCTCTATCTAGTCACTGCTTCTACCTTTCCCTCTGCAC
TGATTTTAAACAAAAATCTTGCCATTTTATGCTGAAAATCCTTCAAAACCTTACCATCTGACACAAAAAAGCCTTAAGACT
TTCCCTGCTCTGAAGACCTTATTTAACCTGTCTCTCCCATACCCCTTACTCCATCTCTTACTATCTCTCTCTCTCCCTCACTT
CTTATGCTTTGTAGCCATACTGCCCTCTTGGCACTCTCCAGTGTGCGCAAACTCTCTGCTCAGGCGCTTTGCACTTTTAT
CTTTCTGCTGTCCGTCTCTCTTCCCAGATATCTGTATGGCTTATACCTCAATGACTTCTTCCAGTATCTGCTTAAATATTTA
30 ATTGAAAGCCTTCCCTGCTTCCCTATATAAAATACATTGACCTCTCTCTGCTCTTACCCTCTGGGCTGCCATTTCCCTAACTC
TCTTAACCTGCTTTGTTTTCTGAATAGCAATAAATATTATTCTTCCATGACAATAAATACTATATGCTTATTTAAGAGTTTCT
GGTATTGTGCTCCCTGTATATATTGTACAACAGTTTCGTATGGGAGAGACCTGTTTTATTCACTGTTATATCTCCAGCACTTA
GAACAGTGCCTCGTGTGTTTAGGCATCTAGTAATATTGTTGAGTGAAATGCAACAGTACAAAACAAATATGATCACTGTAGTAG
AGATGCAAGTACAGTAGAACAACATGGGAAAGAGTGACATGACTACATAGGAATTGAGGAAGACTTTGCAAAAGATGCCCTTAAGC
AGAGCTCTTTGGAGAGAAAAACAGGTAGGCACTTTCATACAAAGAAAAATAGCATTGCAGATACACAGAGGAATGAGAGAACAGTGT
35 GTTCAAGGAACATAAATATAGTACTGCTACAGCATAAATTTGTTGGGGTAAAGATGAACATAGATGAGGTTGAACATGTAGTAGATAG
CACCTGATCATGGAGGGATGGAGGGTTTTTGTGCCAGACTAAGGAATTTAGATTTTGTCTGCTCAAGTGGGAGTGGTAGATAG
GTGAGCAATGAAGACTTCTAAGCAAGGGATGTTTTATTATTATTTATACGTGCTCTGTGTTTTGTGTGTGTGTGTGTGTGT
ACGTATTAAAAAGGTAACATAGCAACATTGTGAAGGTTGAGTATCAAGCTAAACACAGCATTATTATTAAAGATATGTATGATTAG
GAAGATATGATGTAGAAAAACAATTACTATCAGATGTTGGCGAGAGGATATTCTATTATTATTGGACAAAATCATGGATGTATA
40 GTGGGAAGATGTTCTTGGCATACTTGCAGTACATTGTGAAAGAGAGAAATGCACAATGGAGGATTTCTGTTGTTCTTGGAAA
ATCCACCTTTAAGAAAGAGACTTTAAAAAATAGTTAAACAGTTATGTTGAAGTCGTAATGTACACTAGAAAGTGCTTAAGGA
GTACCACTTATGAATCAACAAGAAAGATGTTACAGAATAAAATAAATTTGTGCTTGAATGTCAACCTCTTTCTCTGTAGAGGAAC
AGTTGGTTGTCAATGATATACCTCTGATCTTGATTTATTGTTGAAGGAATAGTGACAGTTGTACACAACTATATCTATCTAG
TTTGTCTGTTGGAACAATGTATCTGCTTTGTAGGACAAATGTCTGCTTTTGCATATTGCAGGACTCCGATGCACAGAATTTTTGA
AATGAGGGATGAACATATAAAACATTTCTTCTTTCACTTCAAAATGCAAGTAAAAACCATTTTTATTATTTCAGCTGGCTTGTCTGT
45 GTCACTCCCTGCAATATATGAATTTCTGAACTTTTATCTTATTAATTTAGGGTCAAACTATGATTTTGAATTTAAGGATA
AAATAGAGGCACCCAAATGTTGCACAGGATTTGAATGTTAAGAATTTGGATTGTTGCACTCCAGCCAGGATGGTAGCTCAGGCC
TATAATCCCAGCACTTTGGGAGGCCAAGGCAGGCAGATCTCTGAACCCAGGAGTTCAAGACAGCCTGGGCAACATGGCAAAAC
CTGCTCTCCATAAAATACAAAGCAAAATAGTACAGGATGGTGTGTCTGTAGTCCAGCTACTCGGGAGGCTGAGGTGACA
50 GAATCAGTGTAGTCCAGGAAGGCGAGGCTGCAGTGAGCCATGATTGTGCCACTGCCTCCAGCGTGGGCGACAGAGCGAGACCCTG
TCTCAAAAAAAGAAAAAAGAAAAAGAAATTTGGCATTCCAAATTCATGAAAAATATGAATCTGTATTATTGAATATA
TTTTTAAAAATTTATCCAAATGCTACAGAAGATGAAGAAATTTTGTGAAGGTAGATACAACTATATATGAGGTTAAGATCCATT
TCCCAAGTTAAAGGATTCCTTTTAAAGTGTGCTGCTATTCAACTCACTATCTGATGGAACAAATGAAAAATTTTCAGTGAAGAA
TTGCTTGGTAATTTCTGTGCTCATGTTGATCCAGATAGCCACGTGTAGCCGGTGGATTACCCAACCATGATGACCAGTAACCTCA
55 AAGTGGGATTTCTAATTTGTTGGAACAAAGGTTAGAAAAAGAAATTTGAGATTAGGTGACAGCATCAACTAGTTAGTTTAAAGCAG
AAAGAGCTTTAATAAAAAAATTTAAGTGGCTTACAAAAATGTTGACAAGGCTGAAGAAACAGACTCTAGATCTAGAAAAAGCCAT
GTTGCATCTAGGCCACCAAGAGAGTTATTGCTCTTTAGGATCAGAAAGACTTTTGCAGAAATTTGAAACTGTAACCTTTAGATG
CCTGCTCTAGAACCTTACCACCTCTGCCATGATCAGGAGTCTACTACTGTTAGGAAATAGCCATTAGCAAGCAGCCACCTTCTCA
GTAAGCCGTTGTTGTGCTGGCCCTAGAGCCAAAGCCCTGCCATCCACAACTGTACTGCAGAAATGGATGCTTGTGCTTTCTTAA
60 TATTATGAAATCTGTGACTGAATACTAGGACTTCAACAAATCTGCTGTGAACATGAACATCTCCATGACAATGTTGTGTAGTAA
AACAAACCAAACTCAACCTCCCTTCTCTTCTGCTCTTGAATTTCTAGTGAGTGCATCTGGTTGGTGAACCTTAAATCACATTTAC
AATGGATGTGAACAGTAATCTACCATAATTACTGCAGGTTTGAACCTGGTTCTCTTAAAGCTGGCTGTCTTAAACGGGCTAT
AGATAAGTTGAGAAAGTTTATAAATAATACCGTCAAAACATGTTGAGAAACTCATTGTTTCTTTGTATATTTTATGTTTATA
65 ATTGAAGTGTGTTAGTGATAAAAAGACCAAAAGAGGGAGTATAAGAAAAACCTCATACAAGGTTACCTGAGCTGAGGAAGGT
TAGTGTGTTCAATAATGAAGAGTGGTCAATAAGGTGGGACTGAAAAGCAGTGTACGATTGGGCACTTAATATTAGTGGTTTT
TTGGGTTTTTTTTTTCTTTCTTACTATTGAGACAGGCTCTGTCTTTTGTCCAGGCTGGAGTGCAGTGGCAGCTCACTGCAAC
TCCATCCCTGGGCTCAAGCCATCTCACAACCTCCCAAGTAGCTGGGACCAAGGATGCACCAAGCCAGCCCTGGCTAAT
70 TTTTGTATTTTATGATAGATGAGATCTCACCATGTTGCCAAGGCTGGTTTCAAAATCTGTTCTCAAGCAGTTTGGCCACCTTG
GCCTCCCAAGGTTGGGATTACAGGCATGACCACTGCGCCAGCCTGTTAGTGTCTTCAAGGTTCTAAACAAGAGTAGAGAAG
TAGGATAAGAGGCAAGTTGCAGGTTTAGGCTGTGAGTTGAAGGAGCACTTGAAGAGGAGATATAGATAAGTTTCAAGAAA
TTTGGCAATGGATTTTTTTTTTTTTTTTGGTCCAAGGCGCATGCTCATTTATATACCAGAATTGGCTAGAGTTTCAAGGCGCTGAAC
AAATATCACACAAAGCAAGTACAGTCTTCCAAAGTTCTTCACTTTGTCTTTTGTGTAGCTTGTATGAAGTGTGGCTCTTAAC
75 ATATTCTCTTATGCTTAGAGATATAATAGGCACAAATTAATCTTTTATATATCTGTAACCAATTAATCTCTTTTGTATTATGTTGT

TTATAAAGTGCCAAATTAATCACTACTATAGTTTGGAGTTACAGTATCTGACTTAACATATTTGTACAATTGATTGTTGAGCCGGGC
ATTGATTAGATGAATTAACCTTCAACAAAGTTTATTTGAACCTCAGTCATTGGTGGATATTTAAGAAGTACAGATTATGATAACTG
CTTTTATAGGAAAGGATGCTTGGTACATTTTTCATATGACATAGATCTTACATTTTATTTATTTCTGGATAAATATCTGATAATG
5 TCAGGTTTCATTGGATTCTTCAAATAAACCCTCATTGTCTCTCTCTTAAGAGGGAGAGGGAAGTAGAATATGTGTAATTTATATAAT
TTGTTTCTCAAACCTGCACCTATGTGAATGAAACAGAAACATGTTCCAGGACAGTTAGTGTCTCAAATCTCCCAATTAGATAT
GGAGCATATTTATATGGAGCATATTTATTAAGTAGAAAATTATATGGTCTAATTCCAAATTTTATATTTTAGGTCCTATAT
GCGACCTAGTTGGACTTTCGTTTAAAAAAGCTAAATTTATGAGAAAGGAGACGTCAAAGAAAAGGAGAGACTGAAGAACAAAG
AAGGCTGAAAGTAAATGAAAATAGAAATTGCTAGACAGTGTCTCGAGGGACAAAGAGGGAATGGGTAGAGAGAGCACAGGTAATGG
10 ATGAGCTTTGGATGAGAAGAGGAATAACTAGTCTTTGGAGGAAGAGGAAAATGGATGAATACCGGTTTCAGATATAGATTATTTGTC
TTAGTGACCTGGTTTATTTGTAAGGACTAACCCATTTTAGGCACTTAATTAATTAATCATTTAAAGGTTGAGATTCTCAATCT
GACTTGAGATGGACCTAAATTTGTTTATTTCTGTTTAAAGTAGTAACCTTATTTTATTTAGTGACAGATTAAAGAGTATCTTACTGGT
ACTATTCATTGGTTTCTTATTTTAAATTTTATAAATAATGTGTTTACTGAGTTTATTTATAGGTGCTTCTTAGGTTCTAATAGA
CTTCTCTAAAATATATTTGGTTTAAATGGCCCTTTAAAGTTGATAGCAGAAAGATACTTGAGTTTATCTAGTCCAAACCTTCATCAG
15 GAAAGCTGTGATTAGTGATTGTCGTAAGTCAACAGCCACTTAGTAGCAGAGTAAGAGAGGAATATTTGGTTTATGTTTCTTGGT
GGTAATGCTGTTTCCCTTATGCCAAGTATTGCATAAGGGAAGTGTGACTGATTTCAGCGCCCATACTTGTGTATGCTCTTGA
GCTAGAGTATCAAAGGACTTCAAACCTTCAAACCTAGACTTTTAGGTTATTTAATATTCCTTCAACAAATGTTTCTCAGCTGTCT
ACCGTATGACAGTCACTGTTTAAAGATCTTGAAGTCAACAGTTCTTGGCCCTCAAGAAATGAGGGAACCAAATAAACAACCTGAA
TTAAAATGAACAGAAAATTTAGATAATCATCAGTGTATCAAAGAAACAAAATGGAGAAATAGAATATGGTAGCAGAACTATGTGC
TTTAGATAGAATAGTCAAGGAAGATTCTCTGAGTTAGTGATATTTGAGCTGAGACTGAATGATAAGGCACTCGCCATTGGAAGATA
20 TCTAGGAGTGTAGCATTCAGACAAAAGCCCTAACTTGAACATGGTGTGGCAGCTTGATGAATGAAAAAATCAACACTAGCC
GGGTTGGGGGAATGGAAGGAGAAGAGATCAGAGAGACCATTAAGTAGGGCTTTGATAGACTGTGGTATAGAAAAGATAATTTTATTC
TAAGTGAATGGTGTGGTATTGGAGGAGGAGAGTGTAGTGAATCACTAAAGAAATATGTTTCAAATATCACACTGCTGATGGAGAA
TGGATTGTAGGAGGGCCAAAAGTGAAGCAGGGGCACCACTTAGGCACTCTCATGTTTGTTCGAATAAAGATTGTGGTGGCTTG
GACTCGGTGATTCTGCTCAAGGCAAGAGAACTGGTTGGATTGGGATTATTTGGAGGTTGCTGGATTGCTAAGAGACTGGG
25 TATGGGAGTTTGGGGAATAGAGGATGGTGTAGAGTAAGAGAGAAAATGGTAGACTGGGGAAGGGCACATCTTGGGGAAGAAAT
CAGATGGTTTTCTGGGACTTGTAAATTTGAAATGCTACTGGATATCCAAGGAGACAGTTAAATAGTCACATCTAGTGTGTTG
GAGGAGAGGTTAGACCTGGTGTTCAGATCTGGGAGGCGTTTCGCATTAAACACCATATACTGCAGAGTTGGCAAGAGAAAGAG
AAGGTGGTTTGAATGAGGCATTGCATGTTTAGAGGTAGCCAGGGGAGAAAGTCAAGAGAGCCAGTGACGTAGGAGAAAAGTC
AGAATATCTGTGTTGTGAAGCCAAGAGAGAGAGCATTTTAAAGAGGGATATTTATGTTCACTTGGGTTAAATCATGCTGCCAGG
30 CCGGTATGATCAAAAACAGAGAAGTGACCGTTGATTGGCAATGTGGAAGGCATTAGTGTCTCAGCTCAGTAGAGCACTTTAGTGGC
TGGTGGGTCAGAACTGATTGGAGAGGGTTGAAGAATGAATGGAAGTAAGAAGAGACAACGACTAGAGATGATGCTTTAAGAA
GTTTTTTTTCTTTTTCTTTTGTGTGTTTTTAAAGTTGAGAAATCCCATCATCGTTTATATGCTGATGGGAATGATCGCTAGAG
AGGAAAATTAATGGTGATTGGGAAAGAAAGATTAAATGTGGAGTAAAGTCTTGAAGTAGCACTGGTGGAAATGGGATAGAGAGCA
CAAGTAGAGGGATTACCCCTTTCATAGGAGTGGGATGCAATTACGTAATATAAAAAAGGACCTCAAGCCACTTTACACACAGCCC
35 CTCCCTCAGTCTTAAACATCTCCTTTAGACCAGCTTGATCTTCTGTAATCACTAGTGTTTTTTTTTTTCTGTGCCCATTTAA
TATGTTCTTTCAGATTGAAGTCATCCTATATAAGGCTTAGTATGAAGCAGTTGATGATATTTAATAACAATTTTAAATTTTATGCC
AACAGGTGAAGCAAAAATTTATGCCATATCTTGGACCCCAAAAATGAGAGATTGTTTCTGTACCATAAATTTGGACCAGGAAG
AAGTTTATCGTACCCAGTTGTGGAAGAAATCTTAAAGTTGGTAGAAAATTTGGTAAATTTAATTTTACTATATAGATTGGTA
AATATTATGCAATTTCCAGATTATAAATCAAGAAGACAAGACAGAAACAGTGCTGCTTTCATGTGGCTTTTCATTGCTCAAA
40 ATGATCTTCTCTTAAATGTTTCCATTTTATCTTTGTTTCTTGGAGAAAAGTTTTCACATGACAGGCTAAATTTGCTTAT
CGTTTGAACCTTCTCAAAGTACATCTTTATTTTATTTATCTAAAGAAATAAGTTACTTAAAGTTTCATAGAAGTTGCTTAACTTAGT
AGTGCAATTCAGGGAATGAATTCATAGATAGTGTCTATCTTGAAGGTGAATTTGCCCTTTGAGAGTATCATATTAATTTCTA
ATTCTAAGAACTGGAATATACCACTCTGCACCGTAGCAATGTGGAACATAAATCTAGTGACAGATTGTGCTGAGAACTCTGTTGAG
45 AGACAAAAGTCAAAATAAGGAGGCGGGCGTGGTGGCTCACGCTTGAATCCAGCACTTTGGGAGGACAGCGGGGAGATCACT
TGAGGTAGAAATTTTCAGACACAGCTTGGGCAACATGGTGAACCCCGTCTCTACGAAAATACAAAAATTAGTTGGGCGTGGTGTCT
GGGTGTCTGTAATCTCAGCTACTTGGGAGGCTGAGGCAGGAGATCGCTTGAACCCAGGGGTGGAGGTTGCACTGAGCCAAAGATT
ATGCCATGTGACTCTAGCCTGGGCAACAGAGTGAACCTCCATCTCAGAAAAAACAACAAAAAACAACAAACAGGGTGT
GGGGTATTATGGAATGAGCATGTGGTGGATGAATATTTGAATGCCATGCTTATCTGAATCATATTTTAGGTCAGTTGATTTTA
50 GGGATCGTTTTTTTTTTATGCTTTAAAAAATATCTTTCTTTACATTTGCTTTGAAAGTTTCCCTTTATGCTTTTATTTTC
ATTTTTTATAAATTTAAATATCTTATGAATTTCTTAGAAAAGTATTGTATAAACTGAAAATACTTGAGTAGCCCAAAACAT
TTCAAGGAGTAACTTGAATCTTTAGTCTTAATTTCTCATATTTGTTCTTATTGGCTTTAGAATGTACTTTAAACATAATATTTGA
ATGTGGATGTGATATATAAGGAAATCTGCACTTTATAATTTGTTTAGAAAATATGCAAGAGATACATCTACACATGCTTGT
CTTTCATATCTGCTTTTTCATATCATATTTGACTAATAGTCTTTTTCATTTGATTCTTATGTTGAAATTAATTAGAAGGCTCTAGT
TACTTTGTGAGACCACTTTTAAAGTTTAGTTTGGTTACATTTGAAGGGAATAATAGTGACAAAAGTTTACCAGGCATTTTAA
55 CAACTAAAAAGCTGAACCACTGTTTCTAGACAAGATCAGATATGACTCTGTAGGAGTATTTTACTTTATATTTAGCTTCTCA
TTTAGTTATGACATATAAAGATACTGCATTTATAGCGATATTTCTAGAGAACTTTTGTCTTTAAACCTTTCTCAGGAAAGAG
GTACACTTGACAAAAGAACTATCTTTCAGAGATTTCGCGTCTTCATAGAAGATCATAGAAGGATAAATATATCAAATGGCATT
CTTAAATGAACCTTATAAATAAGCTTTGCAACATGAGGATGGGCAAGATTCTTGTCTTGAATGCAAGAAGCACCATAATTA
TAAAGATGAAAATTTGGTAAATTAGATTATCAAACCTTAGAGGCTCTTTTCTTTAAAGACACTGTCAAGAAAATTAATGGCA
60 AGCCACACCTGGGAGAAAGTATTCTGACAAAAGACTGTATCCAGAATTTATTTAAAAACAAAACCTGATACTCAAAGGAAGA
CCGATGGCCATTTAAATATGGGAGAAATCTTAAACAGATCTTCAAGAAAAGATATGGCAAGAGCACATGAAAAGGATTGGAC
ATTGTTAGTCATCAGGAAATCAATTTAAACCACTTTTGTCTACTATAGATTCTAGAACAATCTGCAAGTATAGAAATCATATCA
CTGGTTGCTGTGAAGATATGGTGGAGTGTGCAAGTCAAGGGAACCTTCTGGGAGATAAAAATGTTTGTATCTTGATT
ATAAGGTAGAGATTACATAGGTGTATACATTTATCATGTTACATTCATAGAAATAGCTAAAGTTTAAAGGCTGTGATCAAGATG
65 TGAACAACCTGGAGCATTGCTGTTAGGGGTGAAAACAGTACAACCACTTTGAAAACAGTTTGACAGTTTCTTGAATTAACAT
TCACCTGCTTTTAACTCAGCAGTTGCATTTCTCAGTAATCAAAGCATGTGTCTAGAAAAGCTTTATATAAGAAATGTTTATAGCA
GCTTTACTTTTGTAGCCCAACTGGAACAACCTCAAATAACATCACTAGGCGAATGGATTGGAATGCAATGGAATCACTATGCA
CAATTAACACAGTTGAACTACTATGTACACAACAACATCGAAAAATCTCATAGACATTAAAGCTGAATGAACAAGCTGGACATGA
GTACATACTATATGATTCTATTTATGTAGATTGATAGATGATATAGTGATAGAAAACACATCAGAGTTGGGGGAGGATGATGA
70 TGGGGTAACTGAAGGAGAGGCATAAGAGAACTTTCTGGGAGATAGCAGTGTCTTTATTTGATTGGGGTGAAGCTTACACAGTT
GTATAAATTTATCAGAAGTCATCAACCTCTATCTTTAAATTTGATTGTTTATTTGATTGTAACCTATAGCTCAATAAAACTGATTTA
AAAAACCTTGTGTTTAAATTTTTAAAAATATTTTAAAGTTGATTAAAAATGCAATTTTAAATTTTAAATTTTAAATTTTAAAT
TAAAAAATTTTGAAGTAGCCTTTACATAACATTTGGCTGTTTAGGTATATGTTATGTAATAATACAGCTTTACACATTTT
75 TAAGACAAGGATGGTATGAATGACACTATCCTCACCCTCAAATGGTCCACCTTAGGTGAGCATGACCCAGGCAAGTTACTGTATC
TTCTATCCACAGGACTGCTGAAAAGCTATTTGTTTCAAGTCTACTGCACTTAGATCCCTTCAGTGTTCAGCTTGGTTTGTAT

AGAAGCTAGTTGAAATTTAGCATTGAGAATTATTTGGGGCTTTTCAAATTTCTTTCAATGGCATTTTAGTCCATAATTTTCATTAA
CTTTATTGAAAGTGATATTATTTGGCCAGGAACATTAGCTCACTCCTGTAATCCAGTACTTTGGGAGGCTGAGGCGGGTGGATCG
CAAGGTCAAGAGATTGAGACCATCTGGCCCAACATGGTGAAACCCCATCTCTACTAAAAATACAAAAATTAGCTGGGCGTGGTGGC
ATGTGCGCTGTAGTCCAGCTACTCGGGAGGCTGAGGAGGAGAACTCGTTGAACTGGGAGCTGGAGGTTGGTGGTGGATGAGATC
ACGCCACTGGACTCCAGCCTGGCAACAGAGCAAGACTCTGTCTCAAAAAAAAAAAAAAAAAAGTGATATTATCATTCTCAGCAAAAC
TATCGCAAGACAAAAAACCAACACCACATGTTCTCACTCATAGGTGGGAACTGAACAATGAGAACACTTGGACACAGGAAGGG
GAGCATCACACACTGGGGCTGTGTGGGGTGGGGGAGGGGAGGATAGCATTAGGAGATATACCTAATGTAAATGATGAGTT
AATGGGCGCAGCACACCAACATGGCAGATGTATACATATGTAACAAAGCTGCACGTTGTGCACATGTACCTAGAACTTAAAGTAT
AATAAAATATATATATATTAATAAAAGAAAGTGATATTATTTAGTATTATACAAATTATTATGAAAGTGATATTAAATTATTTAT
TATTTTATATTTTGAAGTAATGAGCTTTCCTTTCTTTCTAGCCCATTTTTCAGTGAAGAATTTTACTTTGAGATTCCAAGAAC
TTTCCAGTATTGTCTTTCTATGTTTATGATAAGAAATGTTTACAAAGAGATCTCCGTATAGGTATGTACTATTCAATATTATCTT
TAATCACAATGTTAATGTTTATATTCTGTTCTCTAGTATAGTTTGAATAATGCAAGTAATATATGTCTCAACATCTCTGAT
CTTTTCTGTAGACTACATGTTCTATTGTGAAATTTCAATTTTAAATTTGTATGTTTCTGAGTTATATGACACTTTCTCAGGGAGGCT
TTGAGCTCCCTAGTCACTAGTCAATGTATGTTTATAATTCCTGATGGTTCCCTTTCCATGGTACTCAATTGCTTATTCATTAG
TTGGCTGTTTCTATCTAGGTTCTCTAGTTAAATGTGAAATTTAAAGGGCAGGGACTCTTTTTTGTGTTTTTTTTTTGACACAGA
ATCTGTCTCTATCTCCAGGCTGGACTGCAGTGGTGGGATCTGGCTCACTGCAACCTCTACTTCCAGGTTAAGCGATTCTCTCT
GTCCTCAGCTCCCTGAGTGTGGGATTACAGGCGTGTGCCACCAAGCTAGCCAATTTTGTATTTTGTAGTAAACAGGTTTCA
CCATGTTGGCCAGGCTGATCTTAACTCTGCGAGGAATCCACCTGCTCGGCTCCAGAGTGTAGGATTACAGGCATGAGCCA
CCACGCTGGCCGGCAGGGACTCTTCTACGGAGCACTTACACTTAGTAAAGTGTGGGTAAAGTATTGTTTGTAGTGGTCAAAAT
AATGTTTTATAGAAAGATTGCAATTTGATCTTCCAAAGAACATCTGTTGTTGAGGTTTTCTAATAGAAATTAATTAATCACTT
TAATCATTTATACATTTTCTTCTGTCTGTATTAGTACTGTATTAGTCCATTCTCACACTGCCATAAAGACATACCTGAGACTG
GGTAATTTATAAGAAATATAGTTTATTGGCTCACAGTTTTTTCAGGCTGTACAGGCTTCTGCTTCTGGAAGGCTCAGGAAACCTTA
CATGAGTGAAAGGCAAGGGGAAGCAAGCACATCTTACATGGCTGGCAGGAGAGAGAGTGGGATGTGCTACACACTTTTAC
AATAACAGACTCTCATGAGAACTCACTGTATGAGAGCAGCAAGGGGATGTCTGCCCEATGATTCACTCACCTTATGCCAGGCCC
CTCCTCAACAGTGGGATTACAGTTTGGCCATGACATTTCTGTTGGGACACAGAGTCAAAACCATATCGGTGACCAATAAATATATT
CTCTTTTTTTTTGAGACGGAGTGTCACTCTGTGCGCCAGGCTGGAGTTCAGTGGCGCGATCTCAGCTCACTGCAAGCTCCGCTCC
TGGGTTTCCGCTTCTCTGCGCCAGGCTCCGAATAGCTGGGACTACAGGCTCCACACACGCGCTCAATTTTTTTTGTAT
TTTTAGTAGAGACAGGTTTACCATGTTAGCCAGGATGTTCTGATCTCCTGACCTCGTGATCTGCCACCTCGGCTCCCAAA
GTGCTGGGATACAGGCGTCAAGCACTGCTCCCGGCCAATAAATATATTTCTAAATAATTGTCAGACTAGAGTGTGATCTGTGGG
CATGAACATAAGACAGACTAATGCGCCACATATGTGTACATTTCTGATCTTTGACACCACTATCTTTGATTTAATCATAGGCCAG
AGGTCTAATTTACATTTATCTCTTTCTTTTAGTATCTAAATTTCACTCTCCTTTCTTTTTATTGAAATATGTCAGTCT
CCTACAGCTTAAAAAATTAAAGCATTATTTGGCCAGGTGAGTGGCTCATGCTGTAAATCTTAGCACTTTGGGAGGCGGAGGTGGGC
AGNN
TTCTGATGTTTCTGTGTTTGTATTTGAATCTTAAACAAATGGTCTGTGTGCTGCTGCTGCTACTTATTTCTTTTAAAT
CTCTATAATCTGGCTCTATGTTTTTTGTATAAACCTTTCTGAAATTTGCCAACATCATTTTAAATCAAAATACCTTTAAACAAT
ATGTTTTCTTAATTATAAACTGTTATATGTTTCTAGTATTGTTAGTGATTTCTACAGAAATAACTACAGTTAATTAATTTGTT
GTATTTCTTCCATTCTTTATTTACATATTTGTATTACTACATTTTATTAGATTTTCTTCTTTCAATTAATACCATAGTGATCC
TTTCCCATATCATTAATATTGTTTAAACTATTGTTACATAATATCTTTATAGAAAAGTGTATTATTTAACCACTCCTGTG
TGGTGAACATTTACATTTCCAAATTTGGGCATCTCAGTGGTGTGCTATGAACAAATGTCCTTTGGCATAAATTTTGTGATGT
40 TTTTCTTCCAGGATAAATCTAGAAAGTGAATAATCTGAGTCAAGGGGTATGAACATTTTATGATTTCTCTGTAAATTTCTG
TATTGCCCTCTGCCCCACAGAGTATCATATAATATGGACGACATAAATGTTGTACTAATTTACATTTCTCAAAGATGTGATGG
GCATAACCAATTTTACCACCCCTGGCCATTCTGCATATTATCATTTGAAAAAATTTGCCAATATGATAGGTGAAAAATACACAT
TATATTTTTAAATGTGTTTCTGATTTTGAAGGAATTTGAGGAATTTTTCATATGTTTATGGTATTATGTTTCTTCTGTGA
ATTGATGCTCATCTTCTTGGCTATTTTCTTTGGTTGGAGTTCTAACATTTATCTTAAAGCTTCTTATTTTAGATATGTTAA
45 CTTTGTGCTGATATATACATACCAATCTCTGTCTCAAAAAGGCATTTCTTAGTTTTATTGTTATCTGCTCTGTGTGACAT
TTCATCTCTGATGCTTATCGGTTTGTGAAAGTGAAGAAGACATTTTTCATGTTGGTGTATTTTGTGATTTTCTTCTCTC
CCTCTGATGCTTCTTATATGCACTCTCTGTTTGTAGCAACCGTTGATTATAGATCACCTTGAAGCTGTATCTCAATTCA
GTTTAACTTTACCAACACTCTCCGTTGGCACAAGAGTTGGGACTTTAAGATGAGTAAGACTCGTTGCTCATCAGAGAGGCA
GACTCTAGTCTAATACTAATATATTAATACTAATATATAGGTTCTGTCTGGAGATATGAACAGAAATAGAAATAGTAGGGA
50 GAACAGCTCATTTTATTGTTAGGGGAATAACAGAGACTACATAGGTAGGAAAAAGAAACAATTTCTTTCTTTTCTTTTCT
CTTTTTTTTTTTTTTTTTTTTGGAGTGGAGTCTGCTGTTGCCCAGGCTGGAGTGCAGTGACATGATCTCCGTTCACTGCAACC
TCCACCTCTGGGTTCAAGCGATTCTCCTGCTTACCTTCAAGTAGCTGGGATTACAGGCTGCAACACCAACCCAGCTAATTT
TTGATTTTTTAGTAGACAGGGTTTACCATGTTGAGCCAGGCTGGTCTCGAACTCCTGACCTCGTGATCTGCTGCTTGGCCTC
CCAAAGTGTGGGATTACAGGTATGAGCCACACGCCCCACAGGAAGAACAGTTTCAAGGTGACAGGGATTGGCAGAGACAGAGG
55 GGAAGAATGAATCATGTTTGTGGTGTACCTGCTGGAGAGGGTGATAGAAGCTGAGGATATAAATTTGGGACCAACTGATGAAC
CTAGAAACCACTCTTAATCCAAAGCTAAAGAACTGGACTTTATTTCTGAGACAGTGGTTTGAACCTTTTGAAGATGTATGTA
ACTATATATAACTGGAGTGTGTGTGTGTGTGTGTGTATAATATACATGCAATTTGACTGTAGAAACAGAAATCTGCATATTG
TATATATGATATACAGTTATATATAGTTACATACATATATATATATGACACACATATATACATACACTTATATACACAGA
60 TATATATACACACAGTTATATACACACGAGATATTATATTTCTAATTTAAATATGTAATCTATATACATCGAGTTTGTAGTA
CTGTTGTAGGCCATAAGAAGTGTGATTGGAATAGGAGCGGTTAGAGGCAGGAAGACCAACAGGTATGCTGTTTTCAAATGAA
ATGAGTTAGGGCAGTTGAGTGGAAATACAGATGAGGGAATGTAATTCAGGGGTTTCAAATAGGGCATAGGGACCAAGATGAACAG
GAGATGTGAAAAGGAGAAGAGTTTAAATGGTCTGTTTGTATGGCTGTCAATTAATAGATAAAGAACACAGCAAGAACATTTCAC
TTTTAGTGAGAAGGGGAGAGGATGACTTGGTTTTCAACAAGTTAACTTAGTATTACCGGGGTACATCTAGTGGACATGTTGG
TTGACAGTTGGAATATAGATCTGAAGCTTAGAGAAAAGAGCTAGAGATGTAGATTGAGAGTTATTAGCATTAAAGTATAGGTGA
65 AGCCTGTGTTGGAATGAACGAAATTACCTGGAGTGGATTAAGGAGGTTTCAAGGAAGAAGAGACTTGAAGATAGATAAGGCATAT
CAGGAAGTAGAAAGAAAGATGGGAGAGATTAAATGTGAGAGAAGATAAGGAAACCTTTAATGTGAGCAACTAGAGAAAGGTGGAGT
CAGATAAGGATGATAGAGGCTATTGGTAGTTTAAATAACCTTTGAGAGAATGTATAACTTCGGCCATCATACCTTAAGAAAAAT
GTTTAGTAATTTCTGCTCTTTACATGTTATACTTAAAGTAATATTCTTGAAGGCTTTTAAAGGCTTTTAAATAGCAGCAT
AAAGTTGAGGTTTATGATTTCAGAAAGTGGCTTGTGTTTTGTTTATTTTGAAGTAAAAATCACTTTAGGTAATAATTTCT
70 AGTAAAAATCAGTTGTTTAGGGAGTGGTGTGAGAAAGCTGTAACCTGTTGGTGTGATACTTTTCTTAAATGTTTATCTTTCTAA
GGGATAAAATTTATACATTTAAACAGAAATTTCTTTTCTTTTGCATATAGAGTTATTATTAACACACTACATACCTTTAAAGGT
TGGAGTGGTTGATGGTTTTACTTATACATTTTAACTTTTCTAGTTAGTATCATTTTCTTTTGTGATCATTTTCTTTTGTGATCA
TTTTTTTTTAAATTTGAGCTATTGGAAGTTGAGTTTCTTAATTTAATTTGGAGCCACTCAATTTGATTTAAACACTGACACA
GCATTTTCTGGAATGAAATTTGAGCTAGAATTTAGAGAATCATTTTTAACTTAAGATCTAGATTACAGTTGAGCATA
75 GATAGATTTTAGGGGTTTTTATTTTAAATACATGAGTAATGTGGATTTTTTTTTTGTCAATTCATTATTTCATTTATTTCT

530

531

TTACAAATTCAGGTTTGTGACAACCCCTGTGTCAAGCAAACTCTATCTGCCTCATTTTTCCGACATCATATGCTCACCTCATTTCTC
 TATGACAGCCTTTTTAGCAATAACATATTTTAAATTAATAATATGTATATGTTATTAAGACATATGACACTTAATAGACTG
 CAATATAGTATAAATGTAACCTATATACACTAGAAAACCAAAAATTTTTGTGACTTTCTGTTTATGATATTTGCTTTATTAAGTG
 GCTGGACCCTTAGACAGTATTTCCAAGGTATGCTGTAAAAACATTTTTACCAGTTGAAACATACTGAGTTATTTATATGGAA
 5 ATGGTTGTTAAAAATTTAGTGTGTTGTGATAAAAAACAAAATAAGTTTAGACTTGAGAGGATTTAAGTGCATGTATATGTTTGC
 TCAAAATACCTCTATATAGTCCATTTTTGTGTGTCTATAAAGGAACATCTAAGGCTGAGTAATTTATAAAGGAAAGAGGTTTATTT
 TGGCTTACAGTTCTCTGACAGGCTGTACAGGAAGTATGGTGTGCTGGCATCTGCTTCTGGTGAGTGCTTCAGGAAGCTTACAATCATG
 GTGGAAGGTAAACGGGGAGCAGGCATATTACATGATGAGAGAGGGAGCAAGAGACAGAAGGCAGAAGTCCAGACTCTTAACAAC
 TAGATCTCACATGAACCTAAGCAAGACGCACTTATCACCAAGGGGGTGGCACTCAGCCATTCTAGGGGATCTACCCCATGA
 10 TCTGACACCTCCCACTAGGCCCCACCTCCAACACTGGGGATCACATTTTCATCATGAGATTGGAGGGACAAACATTCAGCCATAT
 CAACCTCTGTTTCTATTTATTTCCAAACTGTATGTCAGAAATTTACACAGTATCTTCTATATGTTACCAAGATGTATGTAATACA
 CAATTGAAATTAATCACAGATATTTTGTGTGAAATTTTGTAAATTAATGAAATAAAGTTAGCGTATAAAATCTAAATCTTCA
 AATAGTACCTGTATTAGCCATTTTTCAGCTGCTGATAAAGACATATCCAAGACTGGAAGAAAAGAGGTTTAAATGGACTATA
 15 GTTCCACATGACTGGGGAGGCGTCAGAACTATGGCAGGAGGTGAAAGGCACCTTCTACATGGCAGTGGCAAGAAAAGAGAGAG
 AAGCAAAAGCGGAAACCCCTGATAAACCCATCAGATCTTGTGAGACTTATCTACTATTACGAGAATAGCACAGGAAAGACTGGCCC
 CCATGATTTCAATGACCTCCCGGGTCTCTCCCAACACATGGGAATTCGGGAGATACAATCAAGTTGACATTTGGTGGGA
 CACAGCCAAACCATATCAGTACGAGAGTAGTGAAGTTCCCTCAGAATGCCCTTAATATAAGATAATGTGATTTATAACCTGCATG
 20 TATCAGCCTAACATAGTCACTGCTATGGAAGTCATATAGAGCAATACCTTCCAAGAATTTGGTTTATTTTAAAGAGGTATA
 ATACAGTGCAAGGTATCTGATCTTCCAACATTTCTGACATACATGAAAGTATACTGTCTAGGCTTCTTTAGGAGATTGAAT
 AATAAGAAATGCAGTTGTAGACCAAACTCAATTACATGTTTATTATCAACATAGTACCTTGTAGATTCTTTTATTTTATTTT
 TGAGATGGAGTTCTGCTGGAGTGCAATGGTGTGATCTCAGTTCACCACAACCTCTGCCTCTGGGTTCAAGTGATTCTCTGCCTC
 AGCTCCCGAATAGCTGGGATACAGGCATGCGCTGCCACCCCGGCTAATTTGTATTTTAGTAGAGACGGGTTCTCCGCTGT
 25 TGGTCAAGGCTGGTCTCAACTGCTGACCTCAGGTGATCTGCTGCTGGCTTGGCTCCCAAGTGCGGATTCAGGCATGAGCCAT
 GCGCCAGCCTCTTGTGGATTCTTAATGTTACTTCTCGTAGGTTCTTATTTTCTTATTTGCTCCTAGGAGTTCTTGAATCT
 GTGGCTGTCTTCTATCAGTTTGGAAAATTCAGGCAATATCTTATCTCTTTTCTGCGCTGTCTTTTCTCTCTCTCT
 CTGCTGTGACTCCAGTTACATGAATAATAGGCCATTTACCATGTCTCATATGCTCTCTATGCTTTTCTGCTGCTTCTTCT
 TGGATATTTTCTACTGCTGTCTCCATTTCCAGCTCTCTTTTCCAGCTGTGGTCTGCTACTTAAATACATTTTCTATTTT
 30 GGTATTTGCTTAGTTCTAACTTTTTATTTTCTTCTTATTTTCTTATTTGCTCCTAGGAGTTCTTGAATCT
 TTTAAAAATAGCTATTTTAGGCTGGATGCACTGGCTCACACCTGTAATCCAGCACTTTGGGAGGCCAAGGCGGAAATTA
 GAGGTGAGAAATGCAAGACCGCTGGCCCAACATGCTGAAACCGTGTCTCTACTAAAAATACAAAATAGCCGGGCTGGGCA
 CATGCTGTAGTCCAGCTACTCGGGAGGCTGAGGAGGAGAAATCGCTGAAACCGGGAGGAGAGGTTGCACTGAGCTGAGATCA
 CGCCACTGCACTCTGGCTGCGTGACAGAGCTAGACTCTGTCTCAAAGAAAAAAGCAATTTAAATCTGTCAATTTCCAATAT
 35 CTGCGTCTCTGTAAAGTCCACTGCTTCTCTCATTTTCTGTTTGTGATCTTGGCATATCTGTAATTTTAAATGGAAATG
 CTGGAGAATAAAATATAAAATATATTGGAGATAATTTAGGGCTGAATGGTATATTTCTCTAGAGAAGATGATGATCCCTGTC
 CAGCAACTCTGTTTCTATCTTGTGGCCAGAACTACATCATATGGCTATCCCTGATCTCAAGGGAGGCTACAGATGTCAAGTTG
 40 CTGGGCTGATAAATGCCCCATCAAAAAACAAACACACACACACACACACACAACTTGTGTTGCTGCAATTCAAA
 TCTATTAATGATTACAGATATAAGTAAACTGAATTTTGTGTGAAAAGAGACTAAAAAGTATTCTAAATGTTCACTGATTGA
 GTTTCTAAACTGAAAAGCAGTTTAAATAATTTAAACTTTATTTTCTTACTAAGAACACACAGTAGTAGTAAAACTTTGA
 AAATCTTCTGAAATTTCCCAACCAAGGTGCTCTTATCAACATTTTGGTAGATGATCTTGAATTTTATACATATATGTTTTT
 45 ATTTTATAAGTTAACTATATAGTATGACCTATTTTGTGATTATTTCTTTGCTAAGGATAGTATGATTTCTTGTAAAGT
 ATATAATGAGTTAGTGTTTACAGTTTAGAAATATAATTTCTTAATTTAACTCATATGCCTTTAATTTAGTGTTCCACCTTA
 ACAGTATGTTTGTGTTCTGCTGCTGTTCTGCTCCTCACACTTTCTTGACCTGGTTAATATATAATGTTGTTTATGTTGATTATAC
 CTAAGGAATGTTTATTTACAGTCACTGGGAGTAAATGAACATATAGGTAGGCTCTGACTCAATAAATATGATTTCTGGCAGAA
 50 CTCATTAATATCTTTTACTGCTATATACTATGATTTAGTTGTAACAAAATGATTATCTTTTCTACTCTATTGTCATAG
 TTTTATTTCTTAGAACTGGAATAGATCCAGCAATTTCTGAGAGACAGTTGTGTTAGCATACGATTTCTGTAATAAATGTATA
 TATGTTAAATTTGTAACCTGCAAAATTTTGTGCGTTGGCTGGCTCCCTGCTAGCCAAATACATACATGCTGTCAACA
 GAAAATATGATTCAAAATTTCTAGTTGAGTAAATTAACAAATACAGATCATGGACCTTCAAGATCACCTTGAATAGTAGAGATT
 55 GTAAATCTAAATGCAAGGAATAATGAAAGACCTAGTTTACAAATATATATGATTTTATGAATATTGTGCTGATTTTATGTTG
 AAGATTTGCTTAATTTAGTTCCAGCTCCAGCTAACTGCTATTAATTTTCTACCACAGATGTTTGTCTCTTTAGACCTTAGCTT
 TCTCAGGCACTCTCTGTTTAAAGTCCATCAGTATTTTGTGCTCATCTTACTATTCTCAACCTGAGCTTTGTACCTGGTG
 TGTTCTAAAGAGGAACAGTGACTAGATAATGAACCTTCTACCTCTAATGAAATCACTCAGCTCATCAGTCCCTAGACATCACTC
 60 CCCTGAAATCTCCATGCAATGTGAGAAATTTGTCTGTGAGCTGGAGGAGGTAATCCAGTACTGTTTCTAACAGTTTAGAA
 TTGTTAGCGCAGAAATGCTCATCACCAGCGGAGGTTAGAAATATCAAGCTCAGATTATGTTTCTTAAAGCTTTATTTCTGA
 GAAAGTTGATTGTTGAATCTTTGAACTTACACTTAATTTTAAAAATTCGTCTATTAATATCTCTTTAAGAAAGTACTCCT
 65 TTATTTTCAAGTCTCCATCTTCCATCAAGACTCTGGCCATATGTTATCTTTTGTATTGTTCTTCCCACTAGATTGTACGCTG
 CTTGTAAGCAGTGACTTACATCTTAACTCTATGATTCTTACCCTCCACAGTGCCTTCTGAACATAGTAGACATTCATA
 AATCTTTATGTTTGTATCAAGTAAGTAGTGACAAATGAGTTTATTTGCTGTAACCTAGTTTATGTTTATGAAATGATG
 70 ATTTCTCTGCTTTTAAAGAGACTGCTTCTGCTTAAATGCTGGTTTATCTTCTGGAAGAGCATCTACATTTTATAAATTTGTT
 TTATCTCAAAATTTCTTAAATTTAGGTATGCTTTCTTTTATGTTGTTGATAATAGATATATAAATATTTATGAAATGGACA
 TAAATCTTAAATTTGAATACCATGTTGACATAAGTATTGTTTATCATATCTTTCAGAACTTGTATCTGCTGTTTGGTTATTAT
 TCATTTAAACAGTACTTAGTGAGGCAAGCCATGTGCTAGTGGTCAAGTAAATCTGTTGTTGTTGAAAGGCACATACCT
 75 TTAATATTTTGTGAGTAAATAGACTACTCAGTTTGAATCTTTTGTGCTTATAGGGTAAAGTTTCACTTGAATTTAACTGAAT
 GAACTGATAACGGAGAAATGGAATGATGTCAGCAGAGCTTGTGTACAGTAAGCATTTTTTAAACCAAAATCAACTGAAATAAT
 CTCAATTTGTTATTTCTGATTTTAAAGCAACTCTTGTTTTAACTTCAAGAACTTTTTTCAAAAATGAAATCTGCTATGTCAT
 TCCCTTTGTGAAGTTGATTTCAATTTAATTTTCTCATAGTCTACTCAGGTTATGTTGAGTCAATTTTATCAACTAATATTTA
 TTGAATATGGGTTAAATGATATATATGGGCATTAAGGATAAGGGTGTCTAACTCTGCGCAGTGGAGAAATGGAAAGGCTCCCAA
 AGAAGGCTCTCTAGAAATTTGTATACCAAGAGCAGCTTTAGAGACTTTGGAGCTAGAACTAATGCCCACTCAGAGATGACCAG
 70 TATTGATCCCACCTACTTTGAATCTCTTTTACCTCTTCCACCTCAAGTCATTTTACCACCCAGACTCTAATCTCCTGGCTG
 TCTTGGAAATCTGTTGAGCCCAATCCCTACTCTTTCTCCCTCCAAACCTTACTCTGTGATATCAATAGACTGCCAGATAA
 CCTTCACTCTCTGCTGGGTGTTTTCTCTATTTTGTGATAGTTGATCTGAAATATCCCAAGATACAGCTTCCAGCCCTTCA
 TCAGTTAGAGGCTTTGTTTTCTATCATGTCACATATTTGAAGGTGAGGAGTAGAGTAGATTAATCTCTCTTATGCTGCTCCA
 GACTGTAACCTTATCTCATCAATTTGTGAACCCAGCTCTTTGAGGTATTCTATCTGTATATAAATATGTTGTTGCTACTATAT
 75 ATAATATTTATTTCAATTTTCTGACCTCTTGAAGAAGATTGCATATGATGACTCTTAATATATCAGTATGATTTCTCT

[illegible]

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75

TTCACTCTGTTGATGATGTGTGCACACTGATTAAATTTGCACATATTGAACCATCCTTGCATCCCTGAGACAAATCCCACTTGGCT
ATGATGAATGATCTTTTAACTGTTGTGCGAATTTGGGTTTGGCTCATATTTTGTGAAGATTTTGGCATCAAGGTTTCATCAGGAGTA
TTGGCCTATAGTTTCTTTTGTAGTATCTCTCTGTTTGGTATCAGGTAACAACCTGGCCCTCATAGGATGAATTTGGAGTG
TTCCCTCTCTATTTTGTGACATGCTAGTAGGATGGTATTAGTCTTCTTGAATAATTGGTGAAGTTTTCAGCAGTGAAGCCAT
CAGGTCCCAGGCTTTTCTTGTGTCAGACATTTTACTGTGGCTTCAATTTCACTTACTTGTTATTGGTCTCTTCAGGTTTGTGGATT
TTTTCAAGTTTCAATCTCTGGTAGGTTGTATATGTCAGGAATTTATCCATTTCTCTAGGTTTTCCTATTTCTTTTTTCAAA
GTTTCTTAAGCTTTTGGCTCTCATACATCACTGCTCTGTAGCAGCAGAGTTCCAGTGGTAGCTTTATGGAATTTATGTTGATTCT
CATCCTTATAGATATTCTGAATTCATGACATTTCTGTTTTTTAGTATTGCTAAAGGCTAGGTTTCACATATGGCTTTCTTTGTG
CTTCTGTGCTGCACTTTGGTTTGGGGGAGATTAATGTGGGAAGATTATATCCTAGTAGTTACTATTATCTCCAGACCTAGAAAG
TCCCACATACAACTTTTGAATTTTAGTGAGACCTCCCTGCCATCCATGATCTTCACTGTGTTCTGTTTCACTTTCTTTCTA
CATCTTTTCCGTGACCTATTGCTGTAGTCATTTTCTCGCAGGTTCCGTAACCTCCCTATTGTTCTCATCATCTTTATTTATCTG
GAAAACTCTAATTTGAAAAATGACCTTCTCTCTGTGTTCAATCTGCACATGAATATAGCTGGAGAAAAATCATGTAGGCTGATTTCA
CTTTAAATTTATCATCAGAGGCTCAGATGGGCATATATCTGCCGTAATTTAACTGTGCTTCTAATACAGCTATAAAGAT
CTCTACCACACAGCTCGAAATTTGCTTACATCTTCTGTAATCCAAATCTATAAACCTAATTTGCATCCATAAATTTGCTCTTAGS
GCAGAGGAGGTACTCTTTTCTTGACATGAAATTTCCATCTGAGCTCTGGAATTCATTTTCTCTCTACTTAATGAGTGTGTTG
TCCTTCAGTTATGCTCTTTTCTGTTTGTGACGTTTACTCTCTCTCATAGGTTCTCACCACAAATAAACATGGTCTAGT
ATCTCTGCTCTAAAAGGACATGCTCCCGACAGCTCATCTCTGCCACCCATACCCAGCTCCTTTTTATCATTCCCATTCTCTGCT
CTCCTTTGAAGGCAGACTCTCTAGGGAAAAATAGTGGTAGGAGTGGTATGAGTGTGTGTGTGCGTGTGTGTGTGTGTGTGTGTG
TGTGTGTTTGTGAATTTCCAGTCCAGCATCTCCAGTAGATTTTCTGTGATGTGGAAATGCTTTGTATCTTCACTGTCCAAAA
CAGTAGCCACTAGCCATGTGTGGATATTGAAAACTGAAATACAGTAATGTGACCAAAAGAGCTGAAGTTTAAATTTATTTAATTT
TAATTAATGTAaaaaaacacacATGGCTAATGACTACAGCATTAGTGACGTTTCAAGTAAAGAACCTGGACTCCTTTTAGCAGT
AGCTTATTTCAGGACTCTGGGCGAGGAATATAGATGAGTCTGGAGCATCTTGGGGTCTCAAAAAGTAAGAAAGTGCTCAAAAAAT
AATGGGATATGTAAAAAGGACATTGAAGCCAATGTAAAGGACATTCAAATTCAGGAATCTGGAAACATTTGAGCTTCAGAAATAA
TAATAATAGTGGATTAAAACTTATAGAATAAAAAATAATAAGCAAATACTGGTACAAATAAACAAATTAaaaaactCAAATACTTGG
TAGGGAGAAAGGACTGATTTTCTTATAGTAGAATTTCTAGTTTATGAATGTAGGAGGAATGATAGGAAATGAAATCAACATTTGGCA
AACATCACAATAAATAGTGGGTGAGGGACATTAaaaaaatCATCTAGATGTCAAGTGAAGGAATGAAGACATGACAAATGAATG
TGATAGATGCCACTTTAATGAGTGTCAAAGTTAAATCATCCAATAATGAGACATCCAGTACTTCCCAATAGGATGCATTGAGAA
GGACACCAAGATACATAACCTCAACCTAATCATGATGAATACATCAGACAACTCAGATTAAAGTAACACTACAAATAACTGGCC
AATACTGGCAAGATCAGCGGCAAGAAAGAAACTAATGAATCTGTCTCAGGATGGAGGAATGAAGACATGACAAATGAATG
CACTATGGGATCTGTTATTGTGCTAGATCAAAAAAGGACATTTGGTGAATTTGAGTAAGGGCTACAGATTTAGTAATTTCTGCT
GTGGTTCTACAAACGTTAACTTTGTTGATGAGTATACAGAACTATTATTTAAACAGCTTTTGTGAATCTGAAATTTATTTCA
AAATAAGGTTTTTAAATTTGCCTGTACTTTGTGCATTCAACCCAGGCTGTGTTTCTAGGTTTTCAGATTAATATGTTCTACTTTGATG
AATCACAATTCGAACTTAAACATTTTAAACTGAACTCAGGAGGCTGAGGAGGAGGAATGGCGTAAACCGGGAGGGCGGAGCTT
CGGGGGAGCGGAGATTGCGCCACTGCACTCAGCCTGGGCGACAGAGTGAGACTCTGTCTCAAAAACCTGAAGTACTGATTCTCATG
TCTTCACTACTCTCTCCCCAAAGCTTTAGCAAAATGTTTAAATCCGCTCAGTATGTTTTCTCATCTAGATTTTCCATTTTATTG
TCTCTGTGCTGGATGATCATATGGAATATAATATAACTTTTAAATGCTTTTGTCTGTAGTTTCTGCTCTTTTGTCTATTCTT
GATTCTGTTTCTATTGATTTTCTTTTCAATTGATCATAAATTTCTAGTCTCTGCAATCTCTGGTTATTTTCTGTGTCATGCCA
GACATTTGAAGTTGCTGGATATTTTAAATTTTCTATGAATGTTACTTGAGCTTTGTTGCGGCACTGGTTAGTTACTTAGAAACAG
TTTGATCTTTTGTGGTTTACTTTTAACTTTTGTGTTAAACAGACAAGCAGCACTTTACTGGAGGGCTAGTTTCTTCTCATATTAA
GGCAGTACCCATGAATTACCAGGTTTTCTACTGTGGCTGATGGTACCTCTGCTAGCCATGTGTGGGTTTTAGGAACATTTGGCTC
TATTTCTTTCAAATGGTTCTTTTCCCAAGCTCAGATGATTTCTCATATATACAGTATCAATACTCAGTGAATCACTCAGTGGGG
ATCTCTGTAGCTCCCTGGAGGTTTCTTTCTCTGTGCAACTTTCTCTCTTTAGTACTTCTGCTCGGGGCTCCCTAGTCACTTTGA
CCTCCTCTGTGACAGCTTTTGCCTCTTCTCTCAGAGAAACCATTAGCTGTAAGCTGGGGCAGTTGGAGGGCTCACCTGTCTT
CACTGCTAGTATTTGTTCAATTCGTTTGGGTTGGAGAGTAATCTAGTCTCTGTTTACTCCATCTTACCTGGATGAGAAGTTAAAA
TTTCTTTAGTTTAAAAAAATCCAAAGAAAGAAATCAGATCAGTCTTATCTGAAGTGTATAATTTTCTTACCTTTTATGTTAA
ATTTTATAGTACTATTTGTAAGTGGTTTATGTGTACATATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
TTTCTGCCCATCCATGATTTATGATATGAATTTGCTTACTTACAGATTTGGAAGAACAGTGCTATCTAGGTAATTAGAAAAATAAT
ATTTCCAAATATGTAATGAATAAACCTATGTTTATAATATTAATTAATTTTGCAGAAATCAATTTTAACTGTTTATATT
TAAAAATTAAGATACTGATGATTTCTGTAGGGTCACTTTGTTTATGGGCATCCGTTTGGTTTGGTTTGGTGGGTTTCTTATCGT
TTCATAAGTTTTTTATAAGTCACTGATGATTTCTCTGCTTTTTTTTATACATCATAAAATAGAAAAATGGATTTCTGTCTATTA
AGGTTTCTCATAAATTTGGTTTATGTGAGATAAAATGTGGTATTACAGGACAGTAATTTGTTTGGGGGCAGTGGGAATGTA
GAGGGCAGCTGGACTTCAGTAAACAAATTAAGAGTAGAAGTTGAGTCTTGGCCAGCTTCTACAAGTTACGCTACCTCTTTGTAGC
CTTACCTTGAACCTCTCACATAACCTGTGAGCCTTACTTCTTTAAATGGCAATAATCTCTCTCAAAAGCAGTTGTGAGAAAT
AGGTGATGTTTGTGAAGGTGATGATGAACTGCAAAATGCCGTGTCAGATATCATTTTGGAGTTTAGCTGAGAGGGAAGGTAAGTTTA
AGCAGTATGATGAGTGGGAAAACTAGCTGATCACTCAACCAACATTAACCAACAGAAATATCTTGGCTTGTGTTTCTTTGGCTA
GTTTCAAAATTTCTTCTTTATTTTATTTATGCTCAGCTATAATAGAAATGAGTCGATTATCATTTCTGTCTTTACTCTGCAGTAT
ACCAATAGCACTTCTCACTCAGATCTGTGACCTGTGGGTTGTGGAGAGAAATAGAGTGTACTCAAGCACTGTGCATTTCTTCAACAAG
AATACTTTTCAGCAACACTCATGAGTTTCTTCTTAGGCTATGAAATTCAGACCTTACAGATTTAACTAACTCAATAAATCAGT
AATATTATGTAGAAAAATTTGAGGAAACAAATCACTAAAGTTAGATTCTGTGTTCTCTGTAATGCCAACAACTGTGAGCCATGGAG
TAGATTAGATGACCTGGTTTTTATGTTCTAAACCATTTTCTACAGAAATGGTGCTTCTAGAGGAGCTGTTTACTGAGAATTTGGAAT
AAAAGGCTGCAGAAATGTGTGAAGCTTGGCTTATATTATGTAATGATTTTAAAGTGAAGTATGAGTGTGTTTCTGTTTGTGCA
TTGATGTTTATGAGCAGGATATGATGCCATAGAGCTGGGTTGGTTTGTAGCTTCTCATTTAGGGTTTGCACCATTCTTTTCTT
TTTAGAGGCCACAGCAGTTTGTATGATTTATCAAAACCGCAAAATGTACCTTGTGGGATTTTAGCAGAGGAATGTTGTGACTAT
TACATATCCCTTATCTACAGTGTGTGAGCTGTTTGAATTTCTTATTTTATTTTGTAGTATTGCAATATATATATATAT
GCCATTAGCATCCCAAATCAAAAAGGCCAAATTTGAAATGCTGAGTGAAGTATTTCTTGGAGCATCATGTCACTGCTCAGAA
AGTTTTGAATTTTGGAGGACTTTGGATTTTGAATTTGGAATGCTCAGTCTGTGTTTGAATGTTTCAATGATGTTGGCATTCC
TGTTTAGTCTCATTTTGAATAATCAGCATAAATTTAAAAATGTCATACATATGTCATACATATTACTACCTATTTCCATATAG
GTAGTATATAGCCATACAGTACGACACATCGAAACAACTTTAACTTTGAATGTATTAGTTTGTGTTTAAAGATAATGTTT
TATCTTGTGTTAACTGGAATCTAATATGTTAAATCTCTTTTATTCTACCTTAGCATCAAGGCATGCCATGGGTTGCCTCTCAATAAT
GGCCAAAGCTGTGACCTTTATGCAACAGTTTCTCTAGTGGGCCCTCTAGTAATATTATTTGAATTTATTTAGGTTTAAAAAGT
TTGATGTTTGAATTTAAAAATTTAAAAAGTAAGATTCTACGAGCAAAATGATAAATAGCTATTATAACACAGATAAATGAAGTCTT
GAAAGAAAAATCTTTAGTGAGTTCTATTATACACTTGTCAATAACAAAGCCCTCTTTTACAGACAGAAATTTGGTACCCCATTTTA
AATCTGCCATGCTCTTAGGCTTTAAGGAACAACTCAGTTTATACAGTACAAATGAGTGTATCTTTAAACACTAACTTGCATTTTCT
ATGATCAGCATTTCTACTTTTCAAAATCTCTGAATTTATGCTAGTAAAACTCTGTTTAAATGAATGCGCAATTCAGAAATAACAG
ACAATTTATATATTTTATCTGGAAGGCACTCAGGACTGAAAAATGGCTTTTCTACTCATGAAATCTGCTCTCTACAGAGAGAAT

TCCAACGTGAGAAAACTGCTGAAGTACTAGAGCATGGCAAAGTGTACCATATCATTGATTTAAATGATTATATAATATTTGTGAA
 AAAACCTATAGCACTTTGTAATACGGTGTGTTATATGACTTCATTATGATTTCTTTAAGGAAGTACACATCTGAAATATGCTAC
 AACTTGAAGGTTTGAATCAGGAAGCAAGAAACACAGTATTCCTCTACACACATACATGATACATACACACCCCTTTTCCCC
 ATCCCCAGAATCTCTAGTTATTCTTACTTTGTAGAAAACTCACTAAGTCACTTTGAAAAATGTATTTATGTATGTATGTAAGT
 5 ACCTAGTACCATGCCGATTTTATTAGGTGCTCAAAACAATAGTATGCTATTAGCAGATACTCAGTCGTATGACATTAAATGCTATT
 AGAGAGATTTATTTTGTGTGTTAAAAATGTTCAATCTAGTGGAGCTATTTTGTTTTTTAAATATCTCTACCTGACAAATTAAT
 TTGGTAACATACAGTTAGAGACAATTTGGCATATGAATTTGTGTTTAAAAAGTCTGGCCAGGCGCAGGTGGCTCACGCTGTAAT
 10 CCCAGCACTTTGGGAGGCCGAGGCGGGTGGATTACCTGAGGTGAGGATTCGAGATCAGCCTGACCAACAGGAGAAACCCGCTCT
 CTACTAAAAATACAGAAATAGCTGGGTGTGGTGGCTCATGCCGTGAATCCCAGCTACTCGGGAGGCTGAGGCAGGAGAAATCGCTTG
 AACCTGAGGCGAAGGTTATGGTGAACCGAGATTGTGCCATTGCACCTCCATCCAGCCTGGGCAACAGGCAAACTCCATCTCAAAA
 AACTAAAAAATAAAAAAGTCACTGTTGGTTTTGTCTATTGTACTGTAGTTGTGTAAGATGTTAACTGAGGAGGCTGGGTAATAAAC
 ACAAGATTTCTTATGCGTTTTTTGTGACCTCCTCTGAATCTATAATTAATTAAGATTTTTTTAAGAGTCTCTATTATACCT
 GAAGCCCAAGAAAGTAAAGTGAAGTAAAGATTTTTCAAGTTCTCTGGGTATTTTTCAACATAGATGAAGGTGCTCTAAATCTTAT
 15 TGTCTTCTCTCTATTATTCTGAGTTGCTTATAGAAATAGAAATGTGTTTTTAAAAACCCCTGAAAAAGGTTGGCAATCTAGTGTGTC
 GTAGAGAGAATAATACAATCTTGGCAGATAGGGGATGCCATAAGCTTATATATTCTTTGATTGAGTTTATAAGGACAGTTACTTT
 TTTCCAAGCAATATTTAAACTGAATCTTCCCTGAGTCACCTTAACCTTTAAATGGAGGTGAGGCTCCCTGGTTGGAATAGCATG
 TTTTATAATTGTGTACTGTTAAGTTCTACAAGGTAAAACTCTACACATTTGGAACAGGAATGACCAAAAGAGCAAAAGTAAAGA
 AGAAAAACAAGCAATCCGAGTTTAAATGAATCTTTATTTTGGAGTAAATTTTTGTTTTACGTAATGTTAAATTAATATGTAA
 TATTAAATGCTAGTTGATTTCTTTTTTCAAACACAGTCATAGTAATCATTTTATCAATTAATGACAGATAAGCATTTCTCTCTGA
 20 AAGCAGTAGAACCATGGTGTGATGCAATGGATGCCAATATATAAATGAATAAAGGCAGAGCTCTAATTTGGGAGCAGGAAGGC
 CAGGGCCATACCCACTCCCACTCATCCTCACTATTCACTGCCCTTCTTTTGACCCCTCCCTTACCCTACCCAGCTCCCTACCTAAC
 ACATAGTGGCCACAGGATTTCTTCTGAGGGTACCCTTTGACAGTCACCTAGTGAAGTAAAGTGAATTAATCACTCAAGAAATCTGAGT
 TCCAGTCAAGTTGACTGAAGAGTCACTAAATGTGACTCAAGTTTCTTATCCTGTGAAAGAATAATCGGAAGGAAACTAGCAGCA
 CTACCTGACTCAGAGTTTTTGTAAAGCCAAAGCATGTGAGAAATCTTTGAGACCATAAATACCTTTATAGTACAGCTTTATTT
 25 TACTTTTTTTTTTAAAGCCTAATTCATTCTGTGGACGCTGCTTATCTTATAGACAGCTTCAGCTGCCTTGAAGTTGTCCCAATA
 CAGTTTGGACAAAAGCTTTGGAGTGTCTTTCTTTGGAGCATTGTTAAAGAAATCCTTTTTCATATTATTTGCAAACTACAGAAAA
 AAAAAATCAAACTCTCAAAAAGATTGTATTCTAATAAAGCATGTGAGCTTTCCATTCTCTGGCTAAGGACTTGGTGAGTTGTTTACGTTTATTAAT
 TTACATTTTGTGCTTTTCTCTGTGTGATTTTTCTTGGTATTTTACAGTGGAGAGAATAACGGTACCTTAGTCATGCTGCTGATT
 30 CGCTACTTTTAAATGAAGAACACAGGCCGAGAAAAATGCCAAAAGTGAAGCAGGAAGAATTGTGGAGGGGGAAGCAAGGGAGAAAA
 AAAAAACAAAAGAAAAAGTACCAATGTGAGACTTTCCATTCTCTGGCTAAGGACTTGGTGAGTTGTTTACGTTTATTAATGCTG
 GGTGCTACTTAACCTGGAGAAAAACAAGAAGGCAGCAATGTAAAGGGCCGCTGACTAAAGGCCTCACACTCCCATTAGCCACCA
 TACCTTAAACCTCAGCTGGATGGAATCTACTCTGCTTCATGGATCCTTACAGTCAGCAGATGACCTTTTAAAGTAGAAGGCGCTGA
 35 CATCTCTGTCTTTAACTGAAGCAAGGAACACAAAGCAGACATATGTATGATATACACACAGTAAATGCAGTAGATATTGGGG
 AGGTGAGATGAATCTGCTCCATTAAAGGCTTGAAGAAATATTGGATTTCTAAGATTGAGGAAGAGAGATTATGAGATGACGAA
 CATTTTGTAGCAGAGGCACAGAGACAGAAAAGCAGAAAGTTATGTCCAAAGTACAGTGAGTACTGATTTTACTGGGCTGCTGTAAG
 AAATTAATGGAACTAAGATTAGAAAGGTAGAGTAAGACCACTGATGAAAGGCTTGAAGTGCCTAGTTTATGGTGTCTAAGTAAATG
 ATTTGAGCCTATAAGTTATGAGTAAACAGTGTGTTGGGAAGGAATTAATCTATGATCTGAGGTCAGGTTGGCTTAGGGAGAAAGAA
 40 CAAAGCTGGGAGAGCTGTTGACTTTAGGTGTAAGAAAAATGGGAGGGGATGGGGTATCTTTCAAGAGAGTGTATGGAATAGA
 GAGGAAGAGGCAGATAAAAGAGAGAAATGCAAGGGCAGGTAACAAATTTGTTATAGAAAAAAGAGAAAGGAAAGTGTGAATGC
 TGCCCCAAGGTTCCAAATCTGGAATAATAGAAGAGTAGGGAAGAAAGAAATAAAGTGGCTTAGTTTGGAGCATAATTAGCTTG
 AGGGCTGACATTTTAAATCCTCCAGTAGGGAGTTTATGACTGAACTTAATATGAGTGTAGTTATTGACCAACACTCAAGGTTTG
 45 TTTATATAACAGCCCAAGAAAGCAGAGAAATAGAGTATACATACAGGAGAAAAAGTGAAGAACTAATTTCTGCGACTCAAGTA
 TTTAACTTTGAGCATGTCAATTAATTTCTGTACTTCAGCTTCTCTATTTTAAAGTGGGTAATAAATCTAGCCCTGTCCGCTCT
 GAGCAGCGCTTCTGATGAACAAAGGAGATAATGATGTGAAAGCACTTTGTAGATTGTACAGCACTGTGACGCTCCAAGTTGTTTT
 AGTGCAAAATAAAACATAAAATTTTGAAGAAATTTATCTAGATTCTGAAAAAGAAACAAAGACAGCAGATAAGGTTGCTCAAG
 50 GGTAGTGCCAGGTAATTTCTATAGAGTGTCTTGGGAAAGGAGATACAGTTGTATGATCACTAAATTAATAGGAGATCAAGGGA
 GGTAAAGACTGAGAAATTTATCGTCAGATGTGGTGTAGAGAGAGATTTAGGAGAGTGTCTGTGAGGAAGCCAGATTATAGGA
 GTTACTATAGTGAAGTGGTGGTGGAGAGTACAAGCTGTAAAGTGTGATTTTTCAGATTGTTGTAAGAAAGGAAAGAGATA
 GGAAGACCAATAATTTAAGGGGAGAAATTTTCTAGACTTGTAGTGAAGTGAACAGCTGTTATTTTGTATTTTTTTTACACTA
 55 CCTTATCTTTTCTGCTACTTCCATAGTTGCTTTTATATTAGCTATTGAGTAAAAATATTACTTGGACATTTTCTCTGCTTTTAT
 CCACAATTGAATATTTTGCAGATGATCAATTTTAAAGCTGTAGGAAAAATGTATTTTTTAAAAAAATTTTACTAAAAATTTTG
 TTACAGGTAACAGATCCAGTAGTTTACACAGAAAGTCCAGTTCAGGTTAGAAAGAGGAGGACATTGAAAGCTAGAAATCAGGT
 ATGTGCTTGGGGTTTTACAGAAATGCTTTTTGTATACCAAAAGAAATCCTAGATTCAACCAAAAAAGTAAACCAACTTTAAT
 60 AGAATTTCTATAGCAAGTTGGTTGATGAACCTTAGAGGAATATGCACTAATTTAAATCCAGATTATCTTTCCAAGTCTGATTT
 GTTTGCAGAAATAGTCAAGTGTATTAAATTTTAAACAAAGATGATCTAATTTTTCATCTGTTTTATTGATTGTTTTTAAATTTT
 TCCCAATTTGTTCTTACATTTCTGATTATAGTGAATGGATGGAAGGAAGTTATCTCAGCCAATTTAGAAATTTTTTTTTTA
 TTTCTTTTAACTATCTGCTGTCTAACAGAAATTTTCAAGGTAAGAAGATAATTTCAACAGGTGATGTTTGAAGTTTGTGCT
 65 GTTCTGAGTGTAGGATGTATATGGTGTGCTAACATCTTTTAAAGCATGTAAATTAATGCTGTAATACAGATCAAGTAATTTG
 AAGCTGTTTTTGTGGTGTGAATCTCTTAAACATTGTTTGCAAAACATAAAGCCAGTTTCAATTTTCCAGATCGACTTGTGGAACA
 ATGGAACCTAGTCCAAGATGTTTTCTAGGTGAGATTAAGTTTCTGTGAACGTATTAAAGAACTGATTCTCTCATCAAGCTGG
 TAAGGCCAGCATTTTGTGAATCCATAGTTTAAATCTCTTTAGTACAGTATATATAGCAAAATAAATGCTTACTCTGAACATA
 70 TTTTAAATTTGCCATGTAAATAGCTAAACGTCAATTAATTTGATATGTTCAATTAATTTGTTGAGAAATTAATTTGAAGTTTT
 ATGACTTGACCTGTGGTACTGAGATAAAAGAACTGAATCATCTAGGAATATTTTCTGTTTCAAGTGAAGACGACTCTTAAGGAG
 AAAAAAGGGAACATTAAAAACATTACATAAGAGTTGTTTGTGTAAGAAAAACGCTTGGTCACAAATCAGTGTCTGATTTCAGAAG
 TTTTATTAGTGGTCATAGGAATGTGGGTATTTGAAAGCAAGGATTTTATTAGGGGACTCAGTTGTTTATGGGAACCTAACCACT
 75 GTTCTTCTTCCACACACCCATTGAAATGTACTGTAGATGGCCCTAATGTTACTTTTTGAATGTCTAAGGTTCTATGTTGTTGAG
 CTGGCACTTTTGGGCTCTGGTTTTTCAATAAGTACTATAATTAATTTTGTAGTTTTCAGTGACTCTAATTAATAACATTACAGTA
 TGTAAATTTCAATTAATGTTTACAGATTTACATTGAGCTAGTTTCTTACAGAAATCAATGTGAACCTATGTTTTTTTCTGCT
 ATAGCACTTAAAGCGTGTGATCTTTTCAATGTTGCGCCAGCATCTCTTCTGTAGATTTTGGTTTCACTGGGTATAAATGAA
 CATGCCCTTCTCATTGCTTTTAAAGGAGCACTTTTGGATCTCAGTTTCTGCTGCTCAAGAGGAGTGTATTAGGTGTTCTTAT

536

[illegible]

HUMAN SEQUENCE - mRNA

5
10
15
20
25
30
35
40
45
50
55
60
65

ATGGCGGCGGCGCGCTGCTGCTGCGGCGGCTTCTTCCGAGGCGCCAGCGGCGAGTGCAGACTGCAGAGCCCGAGGCGGGGACCA
GGACAGTCCGAGAGTTTCGAGTGTTCGAGAGCTGCGGGGCAAGATCTGTGAAGCAAAAAATTATTGCCATATCTTGGACCCACACA
AAATGAGAGATTGTTTCTGTACCATAAATTGGACCAGGAAGAAGTTTATCGTACCCAAAGTTGTGAAAAATCTTTAAGCCCATTT
TTCAGTGAAGAAATTTTACTTTGAGATTCCAAGAACTTTCCAGTATTGTCTTTCTATGTTTATGATAAGAATGTTTACAAAGAGA
TCTCCGTATAGGAAAAGTAGCCATCAAAAAAGAAGACTTGTGTAAATCACAGTGGCAAGAACTTGGTTTTCATTACAGCCTGTTG
ACTCCAATTCCAGAGTTCCAGGTAAGTTTCACTTGAATTAAGTGAATGAACGTGATAACGGAGAATGGAACGTGTATGCCAGCAG
CTTGTGTACACATCAAGGCATGCCATGGGTTGCCTCTCATAAATGGCCAAAGCTGTGACCCCTTATGCAACAGTCTTCTAGTGGG
CCCTTCTAGGAATGACCAAAAGAAGACAAAAGTAAAGAAGAAAAAAGCAATCCGAGTTTAAATGAAATCTTTTATTGAAAGTAA
CCAGATCCAGTAGTTACACCAGAAAGTCCAGTTCCAGGTAGAAGAGGAGACATTGAAAAGCTAGAAATCAGGATCGACTTGTGG
AACAATGAAAACCTAGTCCAAGATGTTTCTAGGTGAGATTAAAGTTCTGTGAACGTATTAAGAACTGATTCTCTCATCAAGC
CTGGTACTTGTCTACAGCAAGAGACAATGGAAACAAGTCACTCAAAAAGTATGACCTGGGGTCTCTTCGATTAAATATATGTTATA
CAGAAGACTACGTGCTTCTTCCAGAGTACTATGGTCTTTGAAAACTTGTCTGCTAAAATCACCAGATGTTCAACCAATATCTGCC
TCAGCTGCTTACATTTTGTAGTGAATATGTCGAGATAAAAATGATGCTGTTTGTCCCTTGTACGACTGCTGTCACCATGATAA
ACTTGTCTCTTTGCCACTGCTGTGGCTGAATTAGACTTGAAGGATACACAAGATGCAACACAATTTTATAGAGGAAATCCCTGG
TACTCCCTCAAAATCTGTGAATCGATCTTAAATTAAGAGAGGAGATAATGTAGAAAAATAAAGGAGAATCTGCGCTACTA
TGTAGACAAGTTATTTCAATACAATTGTAAATCAAGTATGAGCTGCCCACTGTAATGTGTGATATCTTTTATTCTCTAAGGCAGA
TGGCTACTCAGAGATTTCTAATGACCTCATGTTTCTGAGTATCTGAGTGAGCAGCTTGTATTCTTCTGCTGTAGCC
GTAGTATCAGCTCATACTTTTCAATTGCGACCTCATCATCCAGATGCACAGACAATTAGAACATTAACTCTCATCTCAAAAATAT
ACAACTTTGGGAAGCTGGGGAGTCTGTCCAAAGCAAGTCAAGTTTCAAGAGACATTGATGTGTGAATTTTCAAAATGTTTC
AAGAAGAAGGATATATTATAGCAGTTAAAGATTTCTGGATGAATTTTCTACTGAACTAAAGAGTCCAGTGGTACGAGTACGAG
CTGTGTCACCTGAAAGAAGGTGAGATGTATAAAGAGCTCAAGGAAGAACTCGGATTGGAAAAAAGAAATTTAAGAAACGATGGTT
CTGCTTAACAAGCAGAGAGCTCACCTACCACAAACAGCCAGGCAAGATGCAATCTACACAATCCAGTAAAAAATCTTCTGCTG
TGGAAAGTCTGGAAGAGAGCTCTTCAACAAGAAAAATATGTTTCAAGTAAATACATACGGAGAAACCACTCTATGTCCAGGCAAT
AAGTGTGATGAAGCTTAATGAATGGATAGACGTACTCTGCAAGGTGAGCCGATGCAATCAAAACAGGCTCAGTTTATCATCCCTC
TGTGTATCTAAACGGAATTTGGCTCTGCTGTGTCAGGAGACTGGTGAAACACTCTCGGCTGCAAGCCATGTACTGCAAGGTGTCCTG
CAGACATCCAAATAGATATTGATGAAGACAGAGAAACAGAAAGAAATTTATCCCTTTTACCCTCAGTTTACTTAAGCTGCAGAAG
ATGGAAGAGGCTTGTGGAATTTGCAAGTCTATCAAGGACCCAGAAAGAGCCTGATGATTATTCTAATCTTGTAAATCGAGGATTC
TGTAACAACCTTTAAGACAATTAGCAAAATAAAGCATAATTGAGAAGCTGGATGAACCTCATGAAAAATATAGGAAGAAAGAT
CCAGTAGTGCAAAATATGGGAGCAAGGAAAAATCAATTGTTGGGAAAGCATCTTAGAGTTTAAACAGATTGGTTCAGAAGAACTGGA
AAATATTATTTT

HUMAN SEQUENCE - CODING

35
40
45
50
55
60
65

ATGGCGGCGGCGCGCTGCTGCTGCGGCGGCTTCTTCCGAGGCGCCAGCGGCGAGTGCAGACTGCAGAGCCCGAGGCGGGGACCA
GGACAGTCCGAGAGTTTCGAGTGTTCGAGAGCTGCGGGGCAAGATCTGTGAAGCAAAAAATTATTGCCATATCTTGGACCCACACA
AAATGAGAGATTGTTTCTGTACCATAAATTGGACCAGGAAGAAGTTTATCGTACCCAAAGTTGTGAAAAATCTTTAAGCCCATTT
TTCAGTGAAGAAATTTTACTTTGAGATTCCAAGAACTTTCCAGTATTGTCTTTCTATGTTTATGATAAGAATGTTTACAAAGAGA
TCTCCGTATAGGAAAAGTAGCCATCAAAAAAGAAGCTTGTGTAAATCACAGTGGCAAGAACTTGGTTTTCATTACAGCCTGTTG
ACTCCAATTCCAGAGTTCCAGGTAAGTTTCACTTGAATTAAGTGAATGAACGTGATAACGGAGAATGGAACGTGTATGCCAGCAG
CTTGTGTACACATCAAGGCATGCCATGGGTTGCCTCTCATAAATGGCCAAAGCTGTGACCCCTTATGCAACAGTCTTCTAGTGGG
CCCTTCTAGGAATGACCAAAAGAAGACAAAAGTAAAGAAGAAAAAAGCAATCCGAGTTTAAATGAAATCTTTTATTGAAAGTAA
CCAGATCCAGTAGTTACACCAGAAAGTCCAGTTCCAGGTAGAAGAGGAGACATTGAAAAGCTAGAAATCAGGATCGACTTGTGG
AACAATGAAAACCTAGTCCAAGATGTTTCTAGGTGAGATTAAAGTTCTGTGAACGTATTAAGAACTGATTCTCTCATCAAGC
CTGGTACTTGTCTACAGCAAGAGACAATGGAAACAAGTCACTCAAAAAGTATGACCTGGGGTCTCTTCGATTAAATATATGTTATA
CAGAAGACTACGTGCTTCTTCCAGAGTACTATGGTCTTTGAAAACTTGTCTGCTAAAATCACCAGATGTTCAACCAATATCTGCC
TCAGCTGCTTACATTTTGTAGTGAATATGTCGAGATAAAAATGATGCTGTTTGTCCCTTGTACGACTGCTGTCACCATGATAA
ACTTGTCTCTTTGCCACTGCTGTGGCTGAATTAGACTTGAAGGATACACAAGATGCAACACAATTTTATAGAGGAAATCCCTGG
TACTCCGATGCTGAGATGAGATGATGAAAATAGTGGAGGGCACTACCTGAAAGTAAACATTAAACCTATTCTTGATGAGATATGT
GACTCTCTCAAAATCTGTGAATCGATCTTAAATTAAGAGAGGAGATAATGTAGAAAAATAAAGGAGAATCTGCGCTACTA
TGTAAGACAAGTTATTTCAATACAATTGTAAATCAAGTATGAGCTGCCCACTGTAATGTGTGATATCTTTTATTCTCTAAGGCAGA
TGGCTACTCAGAGATTTCTAATGACCTCATGTTTCTGAGTATCTGCAAGTGAAGCAGCTTGTATTCTTCTGCTTCTTGTGAGCC
GTAGTATCAGCTCATACTTTTCAATTGCGACCTCATCATCCAGATGCACAGACAATTAGAACATTAACTCTCATCTCAAAAATAT
ACAACTTTGGGAAGCTGGGGAGTCTGTCCAAAGCAAGTCAAGTTTCAAGAGACATTGATGTGTGAATTTTCAAAATGTTTC
AAGAAGAAGGATATATTATAGCAGTTAAAAAGTTCTTGGATGAATTTTCACTACTGAACTAAAGAGTCCAGTGGTACGAGTACG
CCTGTGTCACCTGAAAGAAGGTGAGATGTATAAAGAGCTCAAGGAAGAACTCGGATTGGAAAAAAGAAATTTAAGAAACGATGGTT
CTGCTTAACAAGCAGAGAGCTCACCTACCACAAACAGCCAGGCAAGATGCAATCTACACAATCCAGTAAAAAATCTTCTGCTG
TGGAAAACTGGAAGAGAGCTCTTCAACAAGAAAAATATGTTTCAAGTAAATACATACGGAGAAACCACTCATGTCCAGGCAAT
AAGTGTGTAGAAGCTAATGAATGGATAGACGTACTCTGCAAGGTGAGCCGATGCAATCAAAACAGGCTCAGTTTATCATCCCTC
TGTGTATCTAAACGGAATTTGGCTCTGCTGTGTCAGGAGACTGGTGAAACACTCTCGGCTGCAAGCCATGTACTGCAAGGTGTCCTG
CAGACATCCAAATAGATATTGATGAAGACAGAGAAACAGAAAGAAATTTATCCCTTTTACCCTCAGTTTACTTAAGCTGCAGAAG
ATGGAAGAGGCTTGTGGAATTTGCAAGTCTATCAAGGACCCAGAAAGAGCCTGATGATTATTCTAATCTTGTAAATCGAGGATTC
TGTAACAACCTTTAAGACAATTAGCAAAATAAAGCATAATTGAGAAGCTGGATGAACCTCATGAAAAATATAGGAAGAAAGAT
CCAGTAGTGCAAAATATGGGAGCAAGGAAAAATCAATTGTTGGGAAAGCATCTTAG

Table 25

MOUSE NOMENCLATURE
ICSGNM Gata1
Celera mCG3964

5

HUMAN NOMENCLATURE

HGNC	GATA1
Celera	hCT10890

10

MOUSE SEQUENCE - GENOMIC

[illegible]

540

[illegible]

MOUSE SEQUENCE - mRNA

60 ACTCGTCATACCACTAAGGTGGCTGAATCCTCTGCATCAACAAGCCAGGTTCAACCCCAAGTGTCCCATGGATTTCCTGGTCTA
GGGGCCCTGGGGACCTCAGAACCTTGCCCAAGTTGTGGATTCTGCCCTGGTGTCTCTCACCATCAGATTCCACAGGTTTCTTTTCT
CTTGCGGCCACAGGGTTTGGATGCAGCATCTTCTTCCACTTCCCCAAATGCAGCCACGGCCGCAGCATCAGCACTGGCCTACTACA
GAGAAGCTCAGGGCCTACAGACACTCCCCAGCTCTTTCAGGTGTATCACTGCTCAACAGTATGGAGGGAAATCTCGGGGGCTCACCT
TATGCTAGCTGGGCTTATGGCAAGACGGCACTTACCCTGCCTCACTGTGTGCCCCACGCCATGAGGATGCCCTTCCCAGGCCCT
65 GGAAGACAGGAAGGGAAGAGACAACAACAGTTCTTGGACCTTGAAGACGGAGCGGCTGAGTCCAGACCTTCTGACGCTGGGGA
CTGCACTGCCTGCATCGCTCCCTGTCAACGGCAGTGCTTACGGGGGAGCTGACTTCCCAGTCTTTTCTTCTCTCCCACTGGGAGC
CCTCTCAGCTCAGCAGCCATTTCTTCCCCAAGTTTCATGGAAGCTGCGCATTTGGCCCTTGTGAGGCCACAGAGATGTGTAAGT
TGGCAACAGGCTACTCCACTGTGGCGGAGGACAGGACAGGTCACACTGTGCAATGCCTGTGGCTGTGATCACAAAGATGAATG
GTCAGAACCGGCCTCTCATCCGGCCCAAGAAGCGAATGATTGTGAGCAACGGGCAGGCACCCAAATGCACTAACTGTCAAACGACC
70 ACTACAACACTCTGGCGGAGGAATGCCAGCGGAGATCGGATGTCAAATGCTTCGGGCTCTATTTCAGAGTCCCATCAGGTGAACCC
CCCCTGACCATGAGGAAGATGGAATCCAGACAGGAACCGCAAGCATCTGCAACAGGGAAGAAAGCGGGGTGCAATCTGG
CTGGAGCGGAGCGGCTGAAGAGACCAAGCTGGTGGCTTCATGGTGGTAGCTGGTAGCAGCAGTAGTGGGAATTTGCGGGAGGTGGCC
TCAGGCTTGGCATTGGGCATCGCAGGTACTGCCCCACTCTATCAGGCGCTAGGACCTGTGGTACTGTACGGGCGCTGCAGGCCATCT
TATGCTCTTTCTGGACCTCTGCTGGGATCGCTGCATCAACACTCTTCCCCACCGGTCTGTCACCTACCACGACGACGACGCTGA
75 TCGCCCCACTCAGTTTCTGAAGGTACACAAGATAGCCTTGACCTTGTGGCAGAGGAGACCCCCCTTTTTTTGGAGACAGGATCTT

MOUSE SEQUENCE - CODING

25 HUMAN SEQUENCE - GENOMIC

543

AATAAAAAGTGTGGAGGCCAGGCATGGTAGCCTGTAATTCAGCAGCACTTGCAGGCCAAGGCAGGCAGATTGGCTTGAGCCCCAGTA
 GTTTTGAGACATAGCTAGGCAACGTGGGCGAAAAATCCCATCTACGAGAAAAATTAACAAAAATTTAGCTGGGTGTGATGGCATGCCAC
 TGTAGCTCTGCTGACTCAGGCATCTAGGCTGGAGGTGAGGATCCTTGAACCCAGGAGGTTGAGGCTTGAGGCTGAGCAGAGATCATGTCAC
 TGATCTCCAGCCTGGGGAACAGAGTGAGACCCCTGCCAAAACAAAAAGAAAAAGAAAAAGAAAAAGAAAGAAAGAAAGAAAGAG
 5 AGAGAGAGAGAGAGAGAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
 AAAAGAAAGAAAGAAAGAAAGAAAGAAAGAGAGTGTGGAGAGATGTGGTTAAATTTAAATTTGAATCCCCATATGGCAGCTGTGG
 AGAACATCTGCAGTTCTCTCAGAAAGTTTAAACATAGAAATTACCATATCACCCCGCAATTCCATTCTAGTTATATACCCAAGAAAAAC
 GAAAAACATATGTCCACATAAAAATCTTTCATAGTAATGTCATAGCAGCAATTATTTGTGATAGCCAAAGAGTCCATCAATGGGTGAA
 TGGATAAGCATATATGTGGCATCTTTTTCTTTTCTTTTCTTTTGTAGACAGGGCTCTACTCTGTTGCCAGGCTGGAGTGCAGTGGTG
 10 CAATCATGGCTCAGCTGCAGCCTCAACTTGTCTGATCTCTCCCACTGAGCCCCCAAGTAGCTGGGACCAACGGCATGCCAACACACA
 CCCCCTAATTTTTCTTTTGTAGACACGTGTTCTTGCTACGCTGCCACAGCTGGTCTCGAATCTCTGGGCTCAAGCAATCCACC
 CACTCTCAACCTCCCAAGATGCTGAGATTACAGGTGTGAGCCACCGCATCTAGCTATATGTAGTAGGTTATTTCTATACAAAGGAA
 TATTATTCACTCAGTCAAGAAATGAAATGAGTACATGATCATGCTACTCAATATGAATGAACCTTAAAAAACTTATGTGAAGTAAAAAGAG
 GCAGTTACAAAAGGCCACATATTATAGCTGCATTATATGAAATGTCCAAAACAGACAAAATTCATAGAGACAAAGAGATTGTGT
 15 ATGGCCCGGGGATGGGAGAGAGAGGAAATGGAATGGGAGGGTGTATGTTAATAGATATAGGGTTCTTTTGGGGGTGATGAAATGT
 TTCTGGAATTAGGTATGTGATGTACACAACTCGTGATATACTAATCGCTTTGCTATATAGCTTTAAGAGTGAAATTTATGTGTTA
 AGAGCAAAATTTTATGGTATGTGAAATTATGTCTCAATAAACAGAAAAAGAAAAAGAAATGAACATTATGATACACACGCAATGTG
 GAAGAATGTCCAGACACATTATGTCTGAGCAAAAGCAGCACACTACTGTATGTGCTTCCATTTCATGAAGTGCAGAAAAACAGGCCA
 AAAAAACCCAGGTATCATATGGTGTATTTGGGTAAACCAATATGGAGTGATGGAGTAAAAAATCATGAGGAAGATAAACACCA
 20 AGCTCAAGGCAGTAGAAGGAGAGAGGAGAAATGGAATCAGTACAAGAGCATCTGTAATATCGCATATCCTTTAAAAACAACTCTGAAG
 TCAATAAGGCCAAAAATTAATGTTTGACAAAAGTAGATGCTTGTTCACAGCACCTTTATACCTTTCCATTTTTTAAAAACAGTCAACC
 AACAGTTTGTCTTGAGGGCAACCGCTTGACTCTTAAACAGGCTTTGGTTGACATTTGCTTGGTCTTTTGACACCCAGCATCTG
 TCAGGCTCTGTCCCCACCTGATGGGCTCCACAGTCAGAGAGAGGCACAAACAGTACAAATGCCATGGGGCTGCAGCAAGCAGGG
 GCTCTAGAACCCAGAAAGATGCCAGGAGGGAGTGAGCCAGTCAGGGAAGGCTTCGAGAGAGAGAGGACATGAAGAAGAGTCTCAA
 25 ATTTAGGCTGACGGAGAGAGCGCGGGCCAGGACACCCACCCCGCCCTCGTCTCCCCCAAGCTGATCTGGCCCCCACTGATT
 CCCCCTATTGCCGCTCCAGCTGCCTCTCTTGCTGGCTGAACCTGTGCCGAGACTTGTAGCCTGGCCCCCTCCACGGGGATGG
 GGGAGGGAATGGGGTGAGGCTTGGCTCACAGCCTCGGGTTTCCAGCTCTTGCTGGAGGCAGGGCTCTGGGGCGCCCTACTCCTC
 ACCCTTGGCTCTCTCTCTGAGCGCTCTGTGCTCTCCAGAAATGAAGAATGGGGTGAGTCCAGCGGCCCAACCCCTTGCTCTAGCT
 CTTAGACATGCTCGAGCTGCCATCCCTGTGAGGACAGATTTCCCTATGTGCGAGCGGCTCTTAATTAATAATATGATGAT
 30 GATAATTTCCATTTACAGAGCACACCATTTATGGTGTGCCAGCAGGCCCTGTGCTGAGTGGTTCTACCCAGCTGGGGGGCTAGGA
 CTTTACCGCTTTTCAGATGAAGAACTGAGGCTCAGAGGGCGCTGGGCCAGGAATCACACAGCAAAATCACAGCAAAATCAGAG
 TTGAGACAGAAGAACCCAGGCTCTGGAGGAACATCTTCAATTCACACCACTTATGAGAACAGTCTGGAGGTGAGGGCAATTATAC
 ACACCTGCACCAACAGGAGCTGTGTGAGAATTGCGATAGAATTATGGTGGAGAGCGCTTAGCACAGTGCCTGGGGTCACTCAGCAA
 TAATGCCGCTGCTGTTATTATTAGTCTATTATGCTATTATTAATATCAGAATTAAACAGGCTCTGGCAACATAGCGAGACTTCAT
 35 CTCTATTGAAAAAAATTTTTTGCTGGGTGTGGTGCCACTGAAGTCCAGCTCCTCAGGAGTTGAGGTGGGAGGATCACT
 TGAGCCGAGAGGTGGAGGCTGCAGTGAGGCAGAGTTGCTCATGCACTCAGGCTGAGTGACATAGTGAGACAGTCTCCCCAAAAA
 ATATTAGTACGTATCATTAATCACTATTGTTGTTAGAATTAGAATAGTTTAGAATTAGTGTAGTATTAAATAGTATTAGTGT
 TAGATTAATAATAGTATTAGCATAGATGAGTATTACATAGAAATAGTATGCTCTCATAGAAGTAGAGAGTAGAGATAGTGGTTA
 CCAGCAGATGGGAGGTGAGGCGAGGAGGAGGGGAGGAGGCTGTCRAATGGGTACAAAGCTACAGCTAGATAGGAGGCATAAGT
 40 TCTGGTGTCTAATGCATAGTACAATGACTAGAGTCAACAATAAATGTATATTTCAAAATAGCTGAAGAGAGGCGTCTCGAATGTT
 CTCTATCAAGAAAGAAAGATAAATGTTTAAAGTGATGAATATGCTAATACCTTGATTGTCTACTACACAATGTATACATGTAAAC
 AAACATCATGTTTATACCCATATATATGTGACAACTATTATGTGTCAATCAATAAATTAAGAAATAAATAGTTTATGTCTCAGT
 ATCAATATTACAATATTGGTATTACTCTTAGTGTGAGCATATTATTAGCATTAGTACTATAAGTAGTAGTAGGGTTAGAAAGGGCT
 ATGTAATCTCCCTTGATGTAGCAGTAGGTAACAATAAATAAGGGGTACTTAATATTATTAGATTTAGATTTCAAGTAAAGTTA
 45 AGATCATGTAACTGGGTAAACCTTACTTAGTCTCCCCAGTCACTGATGAGGTGGCTTATGGGGTATATTATTAACCCATTTT
 TACAGATGAGGAGCTAAATTCACAGAGGGGATGGTAACCTCTCCCAAGGTCACCTGATCCATTAGTGGTTAGGGCAGTCTATGAACGA
 GGATGAGCTGGCTCTAGAGACCATCTCTGAAACCACTGCCACTTAAGTCAGAGGTGCTCTTTGATCGTTCTCTCTCTTACTAGT
 GAGGGTTGAGTGGGGCTGGCCACACCAAGGAGGCTCAATAAATAGGAATCATGGGCTTGCTCTTTCTCTCTCAATCTCCATCTCC
 50 CATGTCATAGGACACTGAGGCTCAGAGGATGAGATAAGAAATGGTAAGATCCCTCCAGGGTGGGCGAGTGGGCAAGCTGACCC
 CACTGACTGGGGCTCCACCTTGGCCCTCTGCCCTTTGTAGGTCTCAGTCTCCCCATCTGTAGACTAGGTGGGCGAGGACAGTCTCT
 TGTCCCCAGTGTGCATGTGTGTGATGAGCTTTTATAGAAAAGTGCTCAGGTAGGTAGGTAGTCTATGTGAGTCTATGAGACAT
 CTGTGGTGTGTGCTCATTAATTTTGTAGGAGGTTGGGCGAGGCAAGAGTGTGGGAGCTGGGGTGGGAGGCTAGCCACATCTGG
 TTGCTCCCTGCTGAGGGCTGAGGGCAGAGCCACAGGCTACATCAATCCACATCTCCCATCTGCACTGCGATGGGACCCACATGCC
 55 AGGGGTGATCCAGTCTGCCCTGGACCTTCTCTGAGTCTGTCTGGAATATCCCTCTGTCTCTGTCTCTCTCTCTCTCTCTCTCTCT
 TCTGCTCTGTGCTCTCCCATCTCACCCCTTCTTCTCTACCTTCTCCCATCTCGAGGAATCATCCCTGCTCCCATCTCAGTT
 TCCCGCTCCAAGGCAGCATGGCGGGCAGAAAGTTGAGGCCACTGTCCCTGGGTGTTCTTACCCCCACACCTCACCCCAAGACAG
 60 CCTGTTACTGCGGCGCCAAACAGCCAGGCTCGCTCATCTGATAAGACTTATCTGCTGCCAGGGCAGGGCGGAGCTGGCGTGAAG
 CCCCAGTGGGCGCTAAGTGAGTGTGCCCTGCTCCCGCAGCAGTGGCTGCGGCTGAGGCTTAGGCTGGGTATCAAGGATATC
 CCACAGGCTCAGTTCTCAATCCAGCAGAACCTCTCTGAGCCTCACTCTCTCTCACCTGCAAAAATGGGTACAGCCACATCCCTCTCT
 CCTGCGAGCCAGGAAGACGCATATACAGGAGTCTAGCCCAACCGGCCCGCAGCAAAATGAAGGCTTTACTCTGTAAGAGGCC
 AGTGAAGTCAATGAACCATATGCTGCTATTCTTATCTGGTTTCTGAGTCTTGTGCTGTGCTGTCAGTCTACAGTCCACCGGAG
 65 CTAGGTGAGCGAGGTTCAAGAATCCCCAGGTTGGGCGAGGAGGGTGAAGAGGGCCCTCAGTGCCCAAGAGGTTGCCCAAGC
 ATGGGACCCGCCCCCTCCCTGGACTGCCCAACCCACTGGGGCAGCAGCACTCCCTGGGAGGAGGAGGAGGAGGAGGAGGAGG
 AGGGAGGGAGGAGGAGGAGGAGGCTCAAGAGGCCAGGCGCAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGGAGG
 GCGGCGCAAGCTTCGCAAGAACACAGCCAGGCTCAGTCTGAGCCCGCAGAGAGGCCCCCAAGGCAACCTGGGCGCTGCTGCCCT
 TACCCTTATGCTTGTCTCAGGCTCCCCAACCCACAGCTGGTCCCCAAGTGTGAGCAGGCTGAAATCCCTTTACAGCTCCTCCAA
 70 CCCACCTGTCTTTTCAACTCCCAATTTACCCCAAACTACCCCTTAAACCCACCTCTTCTGCCCTCTCATCCACTCCGTCCAA
 GATATCTATATCTCTGGATCCCTTCACTTGTCTGCTATACCTTAGGCTGTCTCTCCCTTAAACACTAATCTGTCTGCTCCCAAAAC
 ATGACTTTATCTCCCCAAATCTTTCCCTGTGCCATATCTGATTTCACCTACCCAAACTTGTCTCTGTCTCTCTGACTCTCTCTC
 CAAACCTCACTTTCTGCTCCCCAACCCCTTATCTGCTCTACAACGCTTGTCTTGGCCCCACTCTCTGAGGCCCAACCACTCTCTG
 75 CTCTGATCTGCCAACCCCTAGCTCCATCTCTTACCACCTCTGCTCTTCAACCACTCTTGTGTTCCCAATGACTCTCTCTG
 ATCTCGCAAAACATTTATCTCTCCAACTCCCTGCTCAGTAAAAATATCTTTGTCATCTCAACCAAGTCAACTTCCCCA

546

547

ACCTCCTGACCCTGGGACCTGCACTGCCTTCATCACTCCCTGTCCCCAATAGTGCTTATGGGGGCCCTGACTTTTCAGTACCTTC
TTTTCTCCACCGGGAGCCCCCTCAATTTCAGCAGCCTATTCTCTCCCAAGCTTCGTGGAACTCTCCCCCTGCCTCCCTGTGAGGC
CAGGGAGTGTGTGAACGCGGAGCAACAGCCACTCCACTGTGGCGGAGGGACAGGACAGGCCACTACCTATGCAACGCCTGCGGCC
TCTATCACAAGATGAATGGGCAGAACAGGCCCTCATCCGGCCCAAGAAGCGCCTGATTGTAGTAAACGGGCAGGTACTCAGTGC
5 ACCAACTGCCAGACGACCCACGACACTGTGGCGGAGAAATGCCAGTGGGGATCCCGTGTGCAATGCCTGCGGCCTCTACTACAA
GCTACACCAGGTGAACCGGCCACTGACCATGCGGAAGGATGGTATTGAGACTCGAAACCGCAAGGCATCTGAAAAGGGAAAAAGA
AACGGGGCTCCAGTCTGGGAGGCACAGGAGCAGCCGAAGGACCAGCTGGTGGCTTTATGGTGGTGGCTGGGGGCAGCGGTAGCGGG
AATTGTGGGAGGTGGCTTCAGGCCTGACACTGGGCCCCCAGGTAAGTCCCATCTCTACCAAGGCCTGGGCCCTGTGGTGTCTGTC
10 AGGGCCTGTAGCCACCTCATGCCCTTCCCTGGACCCCTACTGGGCTCACCACGGGCTCCTTCCCCACAGGCCCATGCCCCCA
CCACCAGCACTACTGTGGTGGCTCCGCTCAGCTCATGA

MOUSE NOMENCLATURE
ICSGNM Fkbp5
Celera mCG18519

HUMAN NOMENCLATURE
HGNC **FKBP5**
Celera **hCG17659**

549

[illegible]

ATAAAGTTGGTTTACATTTTTCATATAAAATAAACTAGATTTTATCTTTTAGGCAAGTTAAGATTAAAGCACAAGTTTCATC
 TTGCTGGGAAGATAGACACACACATAAGAGGGCACTATCACGTGTTAGCTGCTCTTCTGCACCAGTGAATGGTCCCATTGGCA
 CAGATGATTGACAGACCGAATTGCACCACACACGCTGGGTACATTTTCTTTCCAAGAAATGACCAACTGCATTAGTATCTTG
 CTCTGCCAAGAATAAAGAAGTAGTCTGGATTACAGTGGATAAATGTTTTTCATTTTGAAGTTCTTTTCTCTTTTCTCTCT
 5 TTTCTTTTCTTTTACTAGAAAAAAGCTACTTGGTATCGTCTAAGTCTATATTTTACAGATTATTCAAATATGGATGTTTAAAC
 TGTATACATCAGAGCATACAGCAGAGCGTTTGGACCTATCTTTAGCAAAGGAGGGAAGTAAATATGCCCTTGACTCTTTGCTGT
 TTAGGAAGTCCAGCAGTCTTTGGCTAGTTAGTTGTGTACCTTTGCTGCTCATGAGTCTGTGTTTTGAGAGATTTTAGCATCT
 TGGCTTTCAACCAACCAAGTGAGGTTTACTGGCTAATTCTGTTTTGCTTTGCTTGGTGGAGATAGGGTTTACAGGATAATCTAGCTGGC
 10 CTGGAACCTACTGTGTAGACCAGGCTGTCTCCGAGTGATCTTTTGGCTGTCTGGCTTTCTATTTTGAAGAGATAAATATGT
 GGTGAGCTGTAATAATAGTCATAACACAAAGGGTGTAGTAAAGGCAAGTTTCTAAGAGCAGGACAAAGAAAGCTGTGAGGAATGGC
 GGTGAATCTGCCCATCTGTCTGGGTGCTGGGGAGTAGTCTTGTGGCTTTGTATCTTTTACAAGTACAAAGCTCTACACTTTT
 TTCTTATGTTTGTCTTTTCTAGATTGTCAAAGAGTGGGACTAGTGACGAGGCCCAATGTTTGGTGACAAAGTTTATGTCCACTAC
 AAAGGGATGTTGTAGATGGAAGAAGTTTGTATCCAGTCTAGACAGAAAGAGCCATTTGCTTTAGCTTTGGCCAAGGTAAGAG
 15 GACAAATTTTTCAGGGTTTGTAGGTTTGAATTCTGTTTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
 TATTTATAAATACCTAATAAATAAAGAAAAAAGAAAGTTCTAGAGATAGATGTGCAAAGAGAGCCAGGCAACTGTTGGTCTG
 CGACTGTGGAATAAAGAGCTAGGTTGTAGCTGACAGTAACCCATTATGAATATACCTCATATACTGGGCATAGACTGGATGAAGA
 TGGGAATTTTCTAGTTACATATATCTTATTAATCTTAAATAAAGGAGTAACTTAAAGGAGTAACTTAAAGGAGTAACTTAAAGGAGT
 AAAAAAGATATTTGAAATAAGAGTAAAAAAGAGTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTT
 20 CCAGAAGAGGGTCTCAGATCTCATTATAGGTGGTGTGAGCCACCATGTGGTGTCTGGGATTGAACTCGGGACCTGCGGAAGAGC
 AGTCAATGCTCTTAACCACTGAGCCATGTACAGCCCATGATTCTGTTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTT
 TGGATCCCTAGGTGTCTCTGGTCTTTTGGGACCATGTGTAACCTTTCTGTAGCAGTGTGAAGGTGATGCCGTTTCACTT
 GCTCAGCTCAGCTGGCAACCTAAAATCTGAGAGGCAAACTGAGGAGCCCTCGTGGGCATCAGTGACAGTCTCTCTGGAG
 CCCATTGTGTGTCTAGTCTCTCTGTGGTGTCTCTCAGTGCTTCAAAGTCCGCTCAGGAAGCTGCTACACTTTCACTT
 25 GGAACCTGAGTCTAGCTCAGTGTGTGGCTGAAACCACTTCTTGGCAAGGAGAGTGTGCTTGGCAAGGAGAGTGTGCTTGGCAAGGAGTGTG
 CTGAAGGAGAAATGAGATAAAGCTGTCACTTCAAGGAAACACCCGACAGATGTTGTTGCCGTGAGCTTCAAGGTGGAAGAACAGT
 TTTAAATATTTTGGGCTGTCCATGCTTAAAGCTTCTGAGCCGTAAGACTTCTCTGTGAGAGCGGTGGGTAATAGTGTG
 ACTTGAGCTCTGGACAGTGAAGTCTGCTCACTGTAGAGTGTGCTTCTGCTTAACTCAGTTAGCCAGTATTTTCCAGGACAGTGTCAAT
 ACATACACCGTCAAGTGTGGACAAGCAGTCCATTCAAGGTAGACAGTGTGTAGGGCTGTAGTGTGAGAGCCCTTTGATGCAG
 30 ATGACCTGCTGAACTCTTTTGTAGTCTAGGAATCTGTGAGCTGCTCTGCTTCTTCCAGGTCTTGTGAGTTTGTG
 CTCTTCTACATCTTCACTCAGAAGCAAGCAATGACTTCTCTTGGCTTATATCAAGTCAAACTTCACTTTTGTAAATTAATA
 ATGACAGCTGAGGACTGACTGGGTTGTTCTGTAGTGAAGTGTCTCTGCTGATCCACAGAGTGTGATCTCAGGTGCA
 GTTTCGAGTGTAAATGCCAGCACTTGGCAGATTGGAAGCAGTGGGCTCAGAAGCAGAGGTTGTCAGTTGACACAGAACAGAGA
 AACATAAGCCAGCATAATGCCACACCACTATCTTCTCAGCAGTTGGGAGTGTCTTCTGCTTAACTCAGTTAGCCAGTATTTT
 35 CCATGACCCAAAGCAAGTTGGGAAGAAAGGTTTATTTGGCTTACCTTCCACAGCACTGTTTCTATTGAAAGAGTCAAGACA
 GGAACCTCAACAGGCGAGGAAGCTGAGGAGCAAGCTGTGACAGAGTCAAGGAGGAGTGTGCTTACTGGTTTGTCTCATCTGGC
 TTGCTCAGCCAGCTTCTTATAGAACCAGGATCACTAGCCAGGATGGCAGCATCCCAATGATTCTCCCAATTAACCACTAA
 TTAAGAAAAATGCCCTACAGCTAGATTACCGATGCTTTCTGTGAGTGTCTCTCAAGTTGATATAAATTAACCACTAGGAGG
 GGCAAGGAGAGGGCAAGTTCAAAGCTGTGTTGATTTACAGCAAGACCTGTCTCAGGAAAAGAGAAAAAATAGCTAGGC
 40 CATTTAGATTTTATATTAATATTATAACAGTTGCTGCTTCACTCAAAATAAAAAAAGGAAGATATAAATCTGTCTC
 GTGAGCTCTTCACTGCTTATAGTATATGTCTCCAAAGGAGTATATAGAATAATTTCAAAGAGACGTTCCAGGCTAAATTTGGGA
 TTCTAGTATGACTTCACTGTTTGTGTTTGAAGATATAGTCTTCCCTGCTATCTTGGAACTCAGATGTAGAGTAGGCTGGC
 CTCGAACTCAAAAGAGGCTACCTACATCTCTGAGTGTGGGCTAAAGATATGCAATACCACTGGGCTGATTTTAGTATTT
 45 TAAATAGGACTTATAGGCTGACTATAAATACTTATTGAAAAACACATATAAATAGAGCACTGCCCTGCTCTGAT
 GGGCACTGCTTCTGTACTGACTGAGCTCATCCCTACACTGTAATGACTGTTCTTACTACCAACCGCTGTGCAATGTTGGGTG
 AAGATAGCACACCACTATGTACATCAGCCAGCATAGTGACACCTGGGTGTTATTGTTATTACAGCAAAAGATTACTGGTGGC
 TTGAAACCAATGCTTAGCCAGTCTTTTGTCTGAGGAAGTTGGGAAGAGAAACAGAAATCAGTCTAAGACCTGGTGTGTAG
 CGCAGAGGAGTGTGCTCCAGGATAGAAACAGGATAGTTCCCTCTGTGCTTACGTTACTTTTGTGTTGGTGCATTTGCCAAAT
 50 TGATTTTCTCTGAAGCACCTTCTTGAATGTGAAGTAAATGATAGAAACTCAATGTCCAGTCTTCTTTCTAAGG
 ATGCTCTTATCTCCCTGCTGAAATTAAGTATACACTTTTAAATATATGCTTACATTAAACTCTGAGTATGTTTAGAGTC
 TGACAGCTTGAAAGTGTGTTGTGTTACCTGAGGAGGAGGAGTACAGAGGCTCAGTGTCTGCTCACTTGTGACAGTGTGAGTCA
 GCCAGGACTCACACCCAGGTTGTGTTCTGAAGTTTCTTCACTCCCAAGGTGTGAACAGTCCAGTCCAGGTCTAAGAACAGCCG
 55 CAGCTGCTCACACCAAGCTGCTTCTTTTGTGAGTGTGCTGCTTACCTTCACTGATCAGGTGGCTCACACTTGTGTGAGCGTGTGT
 TGATGATATTGTGAAGTTAAGTGTACTTTAAAGAAAGTGTCACTTCTCATATACTAAGCCTAAAGACATTTTACATCACA
 GTTAATACACTATTAAAGTACTGAACTTGGTGTGGTGGCACAGCCTTAATCTCCACATAATCCACCATGAGGCCATATC
 ACATTTTGTGTTTCACTCAGGTGTGGAAGGACATTGAGTTGCTTCACTTGGATCAGGTGGCTCACACTTGTGTGAGCGTGTGT
 ATAAACATGAGACCTCTACACAGTCTTTTGTATCACCATCCAGAAGTGGAGTGTGATCATAGCTGAGTCTGTGTTTAAAT
 60 CCTTTTCTCAACTTTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTTATTT
 CTGGGATTAATACTGGGCTCTGAGGGAAGCAGCTGTGCTCTTAACTGTTGAGCCGCTCTCCAGCTCTAATATTTTGTG
 TTTCTTTGAGACAGGTTTCTCTGTGTAGCCCTGGCTGTCTGGAACCTCACTCTGTAGACCAGGCTGGCTTGAACCTCACAGATC
 CTCTGCTTCTGCTCCCGAGTATTGGGATTAAGGCACTGCTCATCATGAGGACATATTACTCAGTCTTAAAGGAGAGGAAAAAG
 65 TCTGGCACATGTATATCAGTGATGAGCCCAATCTGAACCCCAAAGACATCTACTAAATGAAATAATCCAAACCAAAATGAA
 AGCTGTGCTCCCTTGTATTACATGCTGTAGAAAAAGTCTTTGCTGGTGGCTGAGAGGAGGAGGAGAAATAGGTGTGTG
 ATCAGGTATAAGTTTTCAGACGAGTAAACCCAGAACGTTCTGGAGATAGGTCGACAGCGTATACATGTAGTACATCAAGGTGCAC
 ACTGAAAAATGCTTAAGATGATAAATTTGTTTAAACCCAGGCAAACTGTTGAAGTACAGAGGAGTTACAGAGTAAAGAAACAC
 TAGTCAATTATTAATAAGTAGTTTATTAATCAAGGGAAGTATAGCATATTTAAACTATAGTTTAAAGTATTGTGTGGGT
 70 TTTTAAACAGAAAATGTATATACACTACAGAAAGGAAAAATATAGTCCATTGTTTATCTCTGGGCTAGTGTACATTTTA
 CTTACATATTTATTTGTGTGTGTTGTGACAGATGTGTGATGTTTGTACGATGTGTGTGAGTTCAGCCATGGGAGCTGCCATG
 CTGCTTTTGGGAAGGAGTTCTCTTGGACCTAGGACTTCCCACTCGGCGCACTGGCTGTCCGAGCTTGGGGTCTCTCTCTC
 TCTGCTTCCAGTGTGGCTTAGCAGCACTGCTGCTGGGCTGGCTTAAAGTGGAGCTGGGACTCTAATCAGGGGCTTACACTT
 75 GACCGCTGAGCTGTTTGGCAACATTGCTTTAAACTCAGATTGCTGTGCTTTGTAAGTACAGAGGTATGAATATGTATTCTTT
 AGGACTCAATTTTAAATAATTTATTTTGAATATTCTGTCTGAAGATAAAGATCTGAAGATGAAGGCTCTTTGCAACATTGA
 TGCTTGTGCTCCACTGGTTCTCTTCTGGGAGTACAGCTACAGGAGTCTGCCATAGTGTAAACAGCTCCAGACTAGCTTTTG
 CTCTAGTTTGTGTCAGATAGCTGAGTATACACTAGTTCATGAGCTGAGCGATATTTACACACTGTGCCATGAGTGCC

552

5 CAGTTCTCAGTGTGTACATGGCAGCCCAAAATGTCTATAATCCACTCCAGGGAATCTCAAGCCTTGTCTAGCCCCCTGAGGGC
AACAGGCACACATGTGGTCCACAAACATACACGCAAGCAAATGACCATGCACGTAACAACCTCTTAAAGCTGTGAGTACACAG
GTGCCGTACAGCACCACACGTTTGTCTCCTCCCTCATCCAGAACTCTCTTTCCCATACAGCCACAGTGTGTTACGCTCTGCAG
TCCTAGACTGCATCAGGCCACACATTCTGGTAAACACCTAAGAGTGTCTGGGTACAGTGGATGGTAAGACATGGGTGACATAGGGA
10 CTTTGGAGGTCTTAGTCTCAACTATTGAATCTTGCAATTAAGTCTCAATTTACATCTTCAGACAACTTTAACACCCCTTGAGCATCA
AGTTTCTGTGTGTAATAAGGGCTGATTTTCTCTGTTTGAGTTGTGATAGTTGTGGCACAGGCAGGGGAACCTCTTATACAAATGG
GCTTTCCCTTCTAACCTCTCTGCTGTGTTTACATAAATGTTTGTCTTCTTACCTGGATCTATGGAAGGAGTCTTGACTCTT
CATTTCTACACCTAATCCTTGGTAAATTTGTCTCTAGTGACAGTCTTCATTTTGATTTTATATCATCTTAATAGTGGTAGGCTTT
GTTCTGAGTGAGTGGGTACATGGAAGGCCTGCTACATCATGGTCTCTGTGCTGCTTTTATATTGTGAAATCATTTTTTCTC
15 AAAACAGTGTGCTATTACTCTTATCAGAATTCTCACTCTTACAAATCAGCCATGGGTTCTCCCGTGCTTTTCTTGCCAGATAAA
ATGACTGTCTTGTGCTTGTATTTCAGTGTGTCTTTTCCATCAGATAGAGAACCAGTGTGTCTGAGGGTTAGGGGATTTGAC
TATGATGACTGACACCTTAGTCGTACACTTGAGCTTAGGTGTAGCCCTGGCTGCATTGCAGTGGCAAGATTTTGTCTCATGGG
CAGTCGTATTACACTGAAGTAGGGCTCTGAGTAGCCCCCATCCGTCTGGTACAAACTTGCAATTTTGGGTTTCAGCTTGTAGTGT
20 GGTGAGGGAATGACTGTGGGAGCGCAGGCTTGGGCTCTTTTACCCAGGCTTTCTGCTCCATTTGACTGTAGCTGCAGTGTG
TGGTGCAGCTCCAAGTGAATCTCCAGGTTCTTATCTGGGAATTTTCTTCCCTCTCACCTCTAACCAGATACAGTGGTATAGG
TGAGAGGGGAGAGATTACTCTGTAAGAGAGAGGTCTGTGGTGGTCCACACCTTAGAAGCTAGCACTCTGAGGAGCTGTGGTAGG
AGGACCTCTGTGAGTTCAAGGCCAGCTGGTCTACTATCGAGTCCAGGCTAGCTCGAGCTACATAGTGAGACCTGTCTCAAAA
ATAAAAGAGAGAGAGAGAGAGAGAGATGGATTAGAATTGTGAATTTATGAAATATATAAGTAGACCGGCTCGGACTGACGGAA
ACTGGATTCTATAAATCAACCCAAAGCAGGTGTTGAGAAGACCTCTGTAGAGGTACATACCGTCTCTCCCAACAGCTCTGGCAG
25 AACTCCAAGCTCAGCTCAGTGTGGTCAAGGGAGCCACAGCAGGCTCTGGGCAATCATCAGACCTGCTATAAAGCAATATGGGCG
AGCCAGCCGACAGGAAGCCTCTGCTGCAAGAACTCTCAGTCTGGCTAGTGGGACGATCTCAGTGGCCCAAGCTCTCAACCCAT
TAAATATATCTCAGGGGAGAACTGGCAGAGGCAATAGTTTTTAACTCCCAAGTACTCTAGTGTGAGCCAGGCTCTGAAAT
GGACTGCTGAGGGTCTATCTCAGTGTGATCTCTGCTCAAAAGCTAAAGCTAGTCTTAGAGTGACAGGAGGCTCTGAGGCTG
30 CAGGGGTGAGGGTAGCTGAGAGCAGAGAGAGTGTGAGTGTCTTGGAAATCTTAATTTAGTACTGGGCGTGGCAGAACCCAC
AATAGTAATGTTGTGAAGGGTCTTTCTCTAAAGGAATCTTTCCATACATCAACAGTAAGGCAGGGCATCCCCAAGCTTTTATA
TATAGTGTGCTAATAATACATAAGGAATCTGCACCTATATCTTCAATCACCTCTGTTGGGAATGGACTGTCTGTGGCTGCTT
AGATATGCTAGCAGGTAGCTGAGTCTGAGTCTTGAACATCTTAGGTGTATGTGTGCAGATGGTGTGAGCAATGGTCAGCAATGAGA
CGGTGTAGGGAGATGAACAGAAACTCAGAAGTCTTAAAGAGCAATCAGAACTAACAAACCAAAACCCATCCACACTTCT
35 GAAATGGGAGGATAAGGAAGTCTGGAATTTGATGTTTCAATTAACCTCCAGAGTTAGAGGAGAGGCGTGGCGGGCAGGT
CCTCTAGTCAGATGGTGTGATCTGAGCAGTGGGCAAGGAGCAAGGCAAGAGTGGGGTGGGGAAGATTAAGGAAGGAGGAAAT
AAGGGTTTCTCTCAGTCTCAGTCTCAGACAGAAAGTGTGTTAAGACTTAGAAAGGGCAGGTGACAGTGACAAGCAGGAAGTGTGCTT
TTCACTCAGTTATCTCTGTGATAAATGCTAAATCTTACAAGATATAGTAGAATTTGCTAGAAAAATATCCGGCCAGCAAGAAAG
AACACTTGAGGGCTGGAGCCCAATGCCTGACAGCCTGTTGGTGCATATACATACACTGACTGCACACACCATCTTTGTTTAAAGCTGACTTAGGGTGG
40 TAGGCCCTTAAGGCATCTGTATCATGTGTGCATATACATACACTGACTGCACACACCATCTTTGTTTAAAGCTGACTTAGGGTGG
TGTGGTAGAAGGAGGAGAGAGGCGCTTAGAGTTTCTTGGCCATCCAGTCTAGTCAAATCAATAAATTTAGTCTCTGTGACAGAC
CCTGTTTTTAAATACTAAGGTAGAGCCTAGCATAGTGGCATCCGTCTTAAATGCCAGCACTTGGGAGGACAGGAGGAGTGGAGCT
CTGTGAGTTTGGGCGAGCCTGAGTCTACAGAGAAACCTGCTCTCAAAACAAAGGTGGAGAACCTAGGAAAAATCCAGCAT
CAACCATGGCCTTACATGACATGCATGCATGGATGAATGACAGCTGCCAAAGGCACAGGACTCAGAAATGTGCAGATGGTCAAGG
45 CTATTTATCTCTGTACTTGAAGTAAGAAAAACATATCTAAATTAAGTAGAGTAGAGGCTTCATGTATGTTTCTGCTAATGTC
TGATGAGCTGTGTGTTTGTCTCATGCTCTTCAAACTTAGATGATGGCTAGCAAAATGACCACAGGAAGAACACAGGCTTTTCT
TTGCTTTTATCTTAGGTTTGTGTTTGTGTTTAAAGACAAGGTTCTCTGTATAGCCCTGGCCATCTGGAATCACTCTGTAAACCA
GCTGTCTCAAACTCACAGAGATGCTCCGCTCTGCTCCACCTCCACCTCTGAACACTGGGATTAAAGGTGTGTGACCACT
50 GCCCTGAGCTTCAAGGTTTAAACTATTTCAATGTGTCTCAGAAAAATAGCAGTATATCTTTTCAAGGTGTTTAGAGGTAGA
TAGCTCTTTTTCTAGAAAGTATCTCAGGCTCTCAAGTGGAGTGAATCATAATAGAAAAAAGAAAGCAAAACAAAA
CAAAACAAAAATCCAGCCACTAATGAAGTGTCTTTTAGGATTTCTGACAGGATAAAGCTCTGGGGCAGTGTGCTATGACAGC
CTCTGGAGCTTTAAATCAGAGTACTGGAAGCAAAACAGCAAGCAAGTGTGGTGTGATGCAACATTTGCGCCACAGCGCTC
GGAAGCAGAGGCTGCTGGATCAGAAATTTAGGCTAACCTGGTTTACAGAGGGCGTCCAGGACAGCAAGGACTATACAGAGAAAC
CCTGTCTCAAAACCAAAATAAGTAAATAAAGGATGTTGACTGATAGATTAGAAAGGAAAAATCCTATAAATTTGGTGTAA
ATTGCCACTGTTTTCTGCTTTCAGATTAGTCTAATAGTAAATCTTATATAGGGGCTCTGAGCTGTGTGTTGGGCA
55 TACAAAGCAGTGTGGAGCTCTGGGCTGGCCTCTGAGTCTTCTTGTACTTGCACACTGTGTGGGACAAAGTGCATTCTTAC
AGGGATCTTAAAGTGTTCATTGGAGGGCAGCTCCCTACTAATGTGAGGAATAACCTGTATGTTTCTCTGAGTGTCTTCCACA
CCCACAGTAATGCACTGCTTGCTATGAACAGATGAATGAATGAAATGCCAGTCTGTTCAAATGCTTAAATGTAGCGCTGTCT
TCTTTTCTCTTTTACAAATTAAGAAAAAATCAGTTGTATGCTTATGCTGCTTTTACTGCGTGTATGTCTGTGTACCATATGT
ATGACTGGTGTCTGAGGAGGGCAGAGAGGGCATCTCTCTGGAACCTGGAGTATAGGTAGTTGTGAGCCACTTGTGGCTGCT
60 AGGAACCTGAACCCAGGCGCTCTCTACAAGAGCAACAGTGTCTAACAGCCAGCCATCTGTCCAGCCCTTGTGTTTCTCAGAGAC
AAGGTCTCTGTCTACTAAGGCTGGCCTTGAAATAGTGGTCTCTGCTCTCTCTGCTCTTGAAGTGTAGTGATAATCCCCAAAG
TGCCCGTGCCACTATGCCACTCTAACTCTTAGTTATTTACTTTGTGTGGGTCTGGGACTCATACCTCGTGTCTCAAGAGTGGG
AGTAAGCACTCTACTCTGAGTCTATCACAAGCTCTCTCAGTACTTAAACTCCCTGTTGTTGTTGCTGCTATGTGTGTTGCTTG
AGAAGAGGTCTCAGGAGTGTCTCAACCTCCAGCTCTTATGAAGCCCTAGCTGCTCTCAACAGGCTGGGATCTCTGCTCT
65 CTGCTTGCAGAGCCACTACACTTAGCTTTGGAATGCTTCGCTTCTGCTAGCAGTTTCAAGCTAGCCAGGATCATCTCACCACG
GAGGAGAGACCACAGACAGATGTTAGGCGGCAGAAATGACACTGGCTAATGTTGAGGTGTGCTCAAGTCTCTGCTGTTGTA
GGAAGAGCAGTTTAAAGTATATAAGCCATTCCAGTAGTCAGGACCCGCGCTGCTGCTGGGCTAGGGTCTGGCTCGAGTCAACCT
TCCCTGAGTTAGAGCAGGAAGGAGGCTGTGTGGGGGAGTCTGAGCACCATGCTGACAGGAATGATGCTTGTGTGCTGAGTGG
TAAATGTACCTCGTGTCTTACAAGAGTCCCGGCTGCTCTTGGGGCATAAATCACTCTCTCTGGGAACCTTGTGCCAGT
70 GTCATTGACTGGTCCACCTGGGTTCTGCTAGCCAGATGACCACTCTTCTAGTGTGATGCTTACAACTGAGCCGCTTCA
GCCATCACCAGTCTTGGGGACGAGTGCAGAGCTATCAGACACAGCTACTATAATTAGAAAAGGAAAGCAGGCGCTCACCAG
GCTCAGTCTTAGGCTGGGGCATTTCAGCACTTTTTTAAAGGTGACAGCTCTCTCAGTCTTGTCTCTGAAATACAGCT
GTACAGTTTTGGGGTCTCAGATTTTGTGTTTACTGCTGTATGCTCCCAACCCCAATTTAATCGGAGAACAAATGTGCTC
AGCAGTCTGAGTTTCTGCTGACCCACATTCAGAACAGGGGTTCTGTGCTCTTCAAAACAAATTTGCTTAGGGCAGTAAAGAGAA
75 CAATAAGTCAGAGCTCAGTTAAGTGTGTCTGAGTGACAGACTCACTGTATGTGCTTCACTCTGGATTGCACAGCTGAACT
GGCTAGTTTGGTTTGTCTTGTGTTTGTGAGTACCCCTTACAGGTTACATAGACTTTAAGTCAAGAGAAAAATA
TTGCCAGTTTTAACTTGTGTTTCTCTTTTACAAAGAAAAAAGAAAAAATCCCTAAGAAAAAGCCTCTGTGTGCTGTG
TTCACTTGGAGACCATTTGTAGATCATTTGCTTCTGTAAATCATGCTGGATGAGATTAGCAGCAGACCTCTGAGCCCTAGAGGCT
GAGCTCCCGAGTGTGATCATGGTGGCTTGTATTAAATATTTATGAAATGAGTATTTGTGCTATGGAATACAAAGTCAAAAGCACCA
CAGGTCTTCTCAGAGTCAGAGCAGGGGAAGTGGGATTACTAGGAACCGGCGCTCTGATGGATCCGCTCAGAGCAAGTCTTACT

554

555

556

557

ATCCACCCCTGGCCAGGGTGGCATTAAATCGCGTGTGAGGTGGGCTGGGTTCCAGTGCATGTGGCTCGGGCTTGCTGGTTCCT
 TTGTGGACGTATGGTATTTGCAGCCTCTGCTCTGACTGATGAAGTAGCTTGCAATTTGCCCTTGCAATCTCCAGCTTGCTTCTAT
 ATTTTGGGGCTTGGTGTGCACAGTGTCTTAATAATATCTTCTCATGGGTAACCCATTTCTTTTCTTTCTTTTAA
 AGATGATTTTATTATACATAAGTACACTGTGCTCTTCCAGACACACAGAGAGGGTGTGAGATCTTGTATGGATGGTTG
 5 TGAGCCACCCCTGGTGTGCTGGGATTGAACTCAGGACCTTCGTAAGAGCGATCAGTGTCTTACCCGCTGAGCCTTTTCATGGTG
 AGATCTTGGGTTCATCTTCAAGAGTGTCTGTCTCTTCCAGCAGACCCATGTTCCAGGTCCCAGCATGCCACATCCACACCTTAC
 GCTGCCATCTGAAGTGTCTCCCGGACTCCAGTTTGACGTGTCTGTCTCACTGTCTGCTCTGTTTCAITCTTGGCCACCGCC
 TTAGTTTGTGTACATAAATATTTCCAGTGTGTCAATTTCTTATCTTTTAACTCTTAAATTTTAAAGATTTTAT
 TATCTTATATATGTAAGTACACTGTAGCTGTCTTCCAGACACACAGAGAGAGCATCAGATCCCATTACAGATGGCTGTGAGCCAC
 10 CATGTGATTGCTGGGAATTGAACTCAGGGCCTCTGAAAGCGGCCAGTGTCTTAACTGCTGAGCCATCTCTCCAACCTTAAAC
 TCATAATTTAATAGGATATAATTTGAGCCCATACCGATGTAATTTCAATAGCCAAGCATGGGGGCAATGATGGTGACGCTCTTA
 ATCCACTGCAGAGTCAGAAAGTAGGCAGATCTCTGAATTCAGGCCAGGTCTGTGTAGTGTGTTCCAGACAGTTGGGGTACACA
 GAGAAACCTGTCTGGAAGAAAAACAAACAAACAAACATCACACACACACACACACAAATTTAGCCAAACATAGTAGCA
 AGTTCAGTCTTCCAGATAAGAAAGCAGGAGGGTTAGAAATTTCAAGACCAACCTGGGCTGCATGAAACCTCTTTAGAAAAAAAT
 15 AAATCTATTTCTCTATCACTCTTTCTCCCTATCGCCCTCTGACACCGTGTGAGCCGCGCAGAGCATAGTTTTCTTTGTTTGT
 TGGGTACATATGCTGTAGCTCTAGCTAATGAGCATCTCTCTATCTCTCTGTCTGTACACCTGGATTGAAATTTCTGTCT
 TTGGTGTCTCTCAGATTAAGAAAGCAGGAGGGTTAGAAATTTCAAGACCAACCTGGGCTGCATGAAACCTCTTTAGAAATTT
 ATTTAATATGAATACACTGTAGCTGTCTTCCAGACACACAGAGAGGGCGTGCATCTCATTACAGGTGGTTGTGAGTCAACAAAT
 20 GCTGTCTGGGAATTGAACTCAGTACCTCTGGAAGAGCAGTTAGTGTCTTAACTCTGAAACCTCTCTCCAGGCCCTCTGTGTTT
 TTTGTTTTTAACTGAATTTCAACAGTGTCAAAATCATTGTCTCTTTTATGGAGTTAGATCTTGTCAAAAGATCTGGGGGAGG
 TCGGTTTTTATACATAAGGCTTCTGGGGGACACAGGAAAGAGCTTTGTTTTCTCTCGGAGCAGTGTCTCACTCTGACTCCCC
 TGCCCATGTACATGGGTGTCTTACAGCAGCTCTCTCTGTCTCCAGGATTCGGTGTCTCCGAAACCGCAGGAGGGGCCAGGCAGCC
 ATAGACATGGGGTCAGCTTACCAAGTTAATGCAGGAACCAAGAGTCTCAGAGCGCGGCTGTGCTCCCCCCCCCCCCCGCC
 25 TCCTCTCCCCCTCCAGCCCTGAGGTGATTTTCAAGTGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 CTGAGCCTCTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 CTGAGCCTCTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 30 CTGAGCCTCTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 GGGACAGGGCAGAGATGACCAAGACCTGGCTTTAGGAAAGAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAAC
 NNN
 TTGCGCGCAGCCCTTAAATCCAGCCTTGGGTAGGAGAGACAGCGGATTTCTGAGTTCGAGGCGAGCTGTGTATAGAGTAGC
 35 TTCCAGGACAGCAAGACTATACAGAGAAACCTGTCTGAAAGAACCAAAAAAAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG
 GCTGTATAGTGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 40 TGGTGTCTCAGAGCATCTAATATGGGTGTGACTCCCTCTCTGTTGTGTCTGAAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 AAACAAACAAACAGCAAGTAAATAAATATCAGCCTCCAGGATGCGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 CTAGCTTCTCAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 45 ATCTTCAATACATTGTCTTTAGAGCCTGTCTGCGCTTGAAGCCCATCTCAAAATAAATCACTATAAAAGAAAGCCAGAGGC
 TGGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 50 GTAAACAGTATCTGACTCCCTCTCTGAGTGTCTGAAGACAGCTACAGTGTACTTACATATAAATAAATCTTTAAAAA
 AAAAAAAGAAAGAAAGAAAGAAAGAAAGCAGCGGGTGTGGTGGCAGATGCTTTAATCCAGAGGCAAGCGGATTTCTGAGTTC
 AGACAGGAATGGTCTACAGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 55 GAGGAGGNN
 NNN
 60 NNN
 GATTTTGGTGGATGGGTTTGTGGTCTGAAGGAGCCTGTGCGCGGTCTGCGCTTAAAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 AGTTGGGAACAGTTGGGTGGGGGGATAGTAGGTAGAGAAGCTAAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 65 CTTTCCCCAGGCTGAGCTCTGCGCTGAGCCTTGTGCGCAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGTGTGAGT
 AGTGAGGAGGCCAGCTTGGAGGCATGCTG
 MOUSE SEQUENCE - mRNA
 GTCCGCGCGCGGCTGAGCGACCGAGCGTGGGACGGAGCGCGGCTGTGCGGCGGCTGAGCGCGCGCGCGGCGCGGAGAGA
 CGCGGAGCGAGGGACGCGCGCGCGGCGCGGACCGCGGACAGGTCTTCTACTTACAAAGGACAAATGACTACTGATGAGGGCACCAGTA
 55 ACAAATGAGAGAAACCCAGCAGCCACCATGACTGAGCAGGGTGAAGATATCACTACGAAGAAAGACAGAGGAGTATTAAGATTGTG
 AAAAGAGTGGGACTAGTGACGAGGCCCCAATGTTTGGTGACAAAGTTTATGTCCACTACAAAGGATGTTGTGATGGAAGAA
 GTTTGATTCCAGTGTGACAGAAAGAGCCATTGCTTTAGCCTTGGCCAGGCGAGGTTATCAAAGCTTGGGCAATTGGGGTGT
 CTACTATGAAGAAAGGCGAGATCTGCCATTTATATGTAACAGAAATATGCTTATGGCTCGGCTGGCCACCTCCAAAAAATCCCA
 TCAATGCAACTCTCTTTTGTAGATTGAGTCTTGTATTCAAAGGTGAGGATTTATTTGAAGATTACGGCGTTATCCGTAGAAT
 60 CAACCGGAAAGGCGAGGGATACTCAAAACCAACAGAGGAGCAACGTTAAAGTCCACCTGGAAGGCTGTGTTGGTGAAGGACAT
 TTGATTGCCAGATGTGGTGTCTGTTTGGGGAAGGAGAAGACACGACATTCCGATTGGGATCGACAAAGCCCTGGTGAAGATG
 CAGAGAGAAGAACAGTGTATTCTATATCTTGGACCGCTATGGTTTGGGAGAGCGGGAAGCCTAAGTTTGGCATTGACCCCAA
 TGCTGAGCTTATGTACGAGGTACCCCTTAAGAGCTTCGAGAAGGCCAAAGAAATCTTGGGAGATGGACCAAAAGAAAGCTGACGC
 65 AGGCTGCCATCGTGAAGAGAAGGGAAGTGTGACTTCAAGGAGGCAAGTACACGAGGCGGATTGAGTACAGGAAGATAGTG
 TCCTGGCTGGAGATGGAATACGCGCTGTGAGAGAAGGAGTCCAAAGCCTCAGAGTGTCTCTCTCGAGCCTTCTGAACCTGGC
 CATGTGTACTCTGAAGCTCCGAGAGTACAAAGAGCGGTGGAGTGTGCGACAAGGCCCTTGGACTGGACAGTGCATGAGAAAG
 GCTTTGACAGAGGGGCGAGGCCAGCTGTCTCATGAATGACTTTGAGTTCGCGCAAGGGCGACTTCGAGAAGGTGTTGGCAGTCAAT
 70 CCTCAGAACAGGGCCGCTGCGCTGAGATCTCCTATGTGCCAGAGGAAGGCCAAGGAGCACAACGAGCGGGACCGCAGGGGTACGCG
 CAACATGTTCAAGAAGTTCGAGAGCGGGACGCAAGGAGGAAGCCAGCAAGCTGGGAGCAAGAGGCTGTAGAAGGAGCCGCTG
 GCAAAACACACAGAGAGTCAAGCCATGGAAGAGGAAGGCCAAGGCCATGTATGACGCTGCGCCACGAGGGAAGAGTCTTAA
 TGAAGTCCGCGCTCTCTGCTGGGCTGCGCTCAAACCTCAGAGTGAACAGTGTATAGTGAAGGTTTGTACAGTCTCTGTGATTCT
 75 GGAAGCAAAATGGCATAACAGTAGCTTCCAAATGACCACTGTCTGTGCGGGGGGTGGGGGTGGGGGACATGCCAGGAACACAGCA
 GAGAAGGCGCGTGTGTGAAGAGACAGGCCAGCAGCTCAGTCCAGCCATTTCAGTTTGTACCTTTCAGTGTCCAGCAGCAT
 CCTGTGAACCTAGGGCCAGCTGTGTGGGTCTACATCGGCACTAGGGTCACTGACAGAACCGTTGATAAAACAACTCAGT
 GATCTCTGCTTTCTATTGGTGGGCATGGCAGGGGGGGTGTGAGATTGCTTAGCACTGACTGTGCGCTGTAGAACACAA
 GCCACAGCCAGGGGCTCCCTGGTCCAGAGCTGGGTCTAGGCCCTTACCTGCCTTCAAGTCTTTCCAGACTCTTGTAGTGTG

GCTTTCTGTCTAGCCAGCATGTCCACAGACTCTGTGTTCTTCCAACGCCCGTCATTAGTGACAGCTTTCTCTGAGTTTCTG
 TGGTGTGGAGAGTGGGTAGAAAGTAGGTTTATCTTTCCCGCTGTCTGCCCCACTCAAGGACGATGTTAGCGCTCAGCCATCCCTGCC
 CAGCAGCTGTCTCAGCCTCATGTCTCCACCCTGCTGTGTGAGAACCTAAGGCTTGCTCCCGTCCAGACTCGAGTGGAC
 GGACATCCATGTCCACCAGGATTGACGAAGGAAGGAACCTCACACTCTCTATCATGCAAAAAAGTTTCTCAATTTTACTTTT
 5 AGCTTGGGTTTTGAAAGGCCAACTCTAGGAGGCTTAAACCGGCAGTTACTTTAAGCGAGGTAGATACCTCATCTGCACGCCA
 GCCTCTGTATTCTGGTGGAGCTGAAGGGTTGCGGGCTTCCGGTGTCCATGCATCAAGCCAAAGTCTCCAAACTTGGGCATTGA
 ATTAGGGCAATCTTAATAGTTTGGGGTTGGATTTTAGTCTACAGGTGATGATTGAACGT

 MOUSE SEQUENCE - CODING
 10 ATGACTACTGATGAGGGCACCAGTAACAATGGAGAGAACCCAGCAGCCACCATGACTGAGCAGGGTGAAGATATCACTACGAAGAA
 AGACAGAGGAGATTAAAGATTGTCAAAAGAGTGGGGACTAGTGACGAGGCCCAATGTTTGGTGACAAAGTTTATGTCCACTACA
 AAGGGATGTTGTGATGAGAAAGAAGTTTGATTCCAGTCTATGACAGAAAGAAGCCATTGCGCTTATAGCCTTGGCCAAGGCCAGGTT
 ATCAAAGCCTGGGACATTGGGGTGTCTACTATGAAGAAAGGCGAGATCTGCCATTATATGTAAACAGAAATATGCTTATGTGCTC
 15 GGCTGGCCACCTCCAAAAATCCATCAAAATGCACTCTCTTTTGGAGATTGAGCTCCTTGATTTCAAAGGTGAGGATTATTTG
 AAGATTCAAGCGTTATCGTAGAATCAACCGGAAAGGCGAGGGATACTCAAAACCAAGAGGACCAAGGTAAGTCCACCTG
 GAAGGCTGTGTGGTGAAGGACATTTGATTGCCGAGATGTGGTGTTCGTTGTTGGGGAAGGAGAGACCAAGCAGCATTCGATTTGG
 GATCGACAAAGCCCTGGTGAAGATGCAGAGAGAAGAACAGTGTATTCTATATCTTGGACCAGCTATGGTTTGGAGAAGCCGGA
 AGCCTAAGCTTTCGACCCCAATGCTGAGCTTATGTACGAGGTCAACCTTAAGAGCTTCGAGAAGGCCAAAGAATCTTGGGAG
 20 ATGGACCAAAAGAAAGCTGACGAGGCTGCCATCGTGAAGAGAAGGGAACGTGTGTAATCAAGGGAGGCAAGTACAGCAGGC
 CGTGATTTCAGTACAGGAAGATAGTGTCTGGCTGGAGATGGAATACGGCCTGTGAGAGAAGGAGTCCAAAGCCTCAGAGTGTCTCC
 TCCTCGCAGCCTTCTGAACCTGGCCATGTGCTACTGAAAGCTCCGAGAGTACAACAAAGCCGTGGAGTGTGGCAGCAAGGCCCTT
 GGACTGGACAGTGCCAAATGAGAAAGGCTTGTACAGAAGGGGCGAGGCCAGCTGTCTGTAATGACTTTGAGTGTGGCCAAGGGCGA
 CTTTCGAGAAGGTGTGGCAGTCAATCCTCAGAACAGGGCCGCTCGCCTGCAGATCTCCATGTGCCAGAGGAAGGGCAAGGAGCACA
 25 ACCAGCCGGACCGCAGGGGTGACGCCAATGTTCAAGAAAGTTCGAGAGCGGGACGCAAGGAGGAAGCCGAGCAAGCTGGGAGC
 AAGAAGGCTGTAGAAGGAGCCGCTGGCAACAACACGAGAGTCAGGCCATGGAAGAAGGAAAGGCCAAAGGCCATGTATGA

 HUMAN SEQUENCE - GENOMIC
 30 CAAAAACCAAGCAAGTTTATTAGGGATTTTCAAAGGGGAGGGAGTGTGTAATAGTTGTGGGTGACAGACATCAAGTACTTAAC
 AGGGTAATAGAAATATCAAAAGCAAGTGGAGGCGAGGCGAGATCACAGGACCACAGGACAGAGGCGAAATTAATTTGCTAATAAA
 GTTTCGGGCACCAATTGTCTGATTAACATCTTATCAGGAGACAGGGTTTGGAGTCACTAGTCTGACCAAGTTTATTAGGCGGG
 AATTTCCTCTTCTAATAAGCCTGGGAGCGCTATGGGAGACTGGAGTTTATTTACCTCTGCAATCTCGACCAATAGAGACAGGTA
 TGCCCCGGGGGGCAGTTGAGAGACCTACCCCTAGGTGCGCATTTCTTTTCTCAGGACTTTCCATGCTGAGAAAAGGAATTC
 35 GAAATATTTCTCCCATTTGCTTTTGAAGAAGAGAAATATGGCTCTGTTCTGCCCGGCTACCGCGGTACAGAGTTTAAAGTTATC
 TCTCTTATCTCCAGCAATTTGCTGTTATCTGTTCTTTTTCAGGGTGCACCAATTTATGCTCAAAACACATGCTGTACA
 ATTTGTGTAATTAACGCAATTATTACAGGGTCTGAGACGATATACATCCTTCTCGGCTGACAGGATTAAAGATTAAGTAAGA
 CAGGCATAGGAAATCACAAGGATTTGATTGGGGAAGTGATAAGTGTCCATGAATCTTTACAATTTATGTTTAGAGAGTTCAGTA
 AAGACAGGCATAAGAAATTAACAAATATTAATTTGGGGAATTAATAATGTCCATAAAATCTTCAATTCACGTTCTTGCTCA
 40 TGGCTTCAGCCGGTCTCTCGTTTGGGGTCCCTGACTTCTGCAACACCTTCTTATATGTATCAAACTCATACTGAACATAGT
 TCTGGGTGCAAAAGAGGATTATTTTGTGCACTAACCATAGTCTTTGTCCACAAGTTAAACAAAAACAGTGTAGTATACAGTA
 TTTTAAATAATTTTGTGCAATTAATAAATTTGTGTACTTGAATCATTAGAAAACAAGTATTAGGTGTGGAGTTTCTCACTGTG
 GCATCATGTTAGAATTAAGAAAGTTTCAAGAGTTTGGAGCATCTTGGATTTCGGATTTTTCCAATTAGGAATGCTCAACCTAATCAG
 AAGTAAGACTTGGATATTAAGAAAGTTGAAGCCACGGTTTTATTGCTTAGTAGTATATACTGCAACAGTACTTTTATCTTAAT
 45 TATTGTGTAGAACTCTGATGACTCCCAACATATAACTGTCAACACCTTCTCTGAGCTCAGGCCTTATCTGTATACCTTC
 TGGACATCGCAACAGCACCCCTTGTCTCAACATACCCAGCCAGAGTCTCTTGCTCTCCATAAAAAGCAATCTGAAATGTTTCAAT
 TAAATTGAAGAGAAAGATAAAGTCTGATGAGTGAACCATGAAATGTTTCACTTTTCCCTAAGTTTAAAGAAATCATGA
 TCATTCTCAGAGGTAACACTGTTTGAAGCAGTTTGGTAAGTTATCTTTCCAAACTTCTCTATATATAAGCAATATACAAACACA
 50 TATATACTTTTCTCTTGGAAATAGGATCATGTTACAAATCATCTGCAACTCACCATTCACTTAATAGTACATCTTGAAATC
 CATCTGTCTTTTCACTGTGAGTATTAGAAGATTGTTTATGTGGAATGGGTAAGACGTCACCTGCTCCATATTAGTATATTTCAGA
 GATTAGCTGTCTTAAAGGGAACAGTGAAAGACATTTTGGCATGTAATGAACAAATTTGCATAATTTGATTTCACTGCTCTA
 AAATGATCATACCCACCCACCCCAAAATCTACAAACAACCTGGGAACCATGGTTGGTGGCTGCAAAATATATTGGTATAAATTACA
 CTGTTTGTGCCAGGTGCGGTGGCTCATGTCTGTGATCCAGCACTTTGGGAGGCTGAGGCGGGCGGGTCACTGTAGCTGAAGGAGT
 55 TCGAGAGCAGATGGCTAACATGGCGAAACCCCATCTCTATAAAATACAAAAATTAGCCGGGCTGGTGGCCACACTGCTGTA
 TCCCAGCTACTCAGGAGGCTGAGGAGGAGTATCATTTGAACCTAGGAGGCGGAGATTGCACTGAGCCAGATCAGGCCACTGCAC
 TCCAGCCTGGGCAACAGAGCAAGAGTCTGTCTCAAAAAATTAATAAAATTAATAAAATTAATAAAATTAATAAAATTAATAAAAT
 60 GCCATTGTGGCATCATCACTGACTTTTTTTTTTTTCAATGGTCCAGATAACCAATCATCACTGGGCACTATGCACCTTAACA
 ATACACTCATTTACTACAATGCTATTCTTTTTTCTTTTTTTTTTTTTTTTGGACAATATCTTGCTCTGTTGCCAGGCTGCAGT
 GCAGTGGTGCAACCATGGCGTGATCTCTGCTCAGCCTCTCCAGTAGCTGGGACCACAGGCGGTGATTTTTTATTTTATAGCAGA
 GATCGGGTCTCACTGTGTTGCCAAGCTGGTCTCAAACTCTGGGCTCAAGCCTTGACATCCCAAAGTACTGGGATTACAGGTGTG
 65 AGCCACTGCGCTGGCATTCTTTTATAATGGATGAACATTACAAATATTTTCCCAATTTAGTTGTTGGATGTTTGTGTTAGA
 CTCTTAGCTAAATGATTCTCTACTGTATAGATTATCTCATGCTTTTCAAAACTGTATATTTTATAGTATGCAATTTGCCAAAT
 TTAGTCTAACATTCCCATGACCATCTTTAAGGAAGAACTTTGAAATACCTTTATTTAGCCATACGGTTAAATTTAGCTGGAAC
 TAAGTGATCTGTGTTTGTGATGAACGATCCATGCTATTCTTGATCATGACTTTTTCATCTTCCCTTGATTCTTTCCCTATA
 70 TGCAATTTAAGCCTGTCTGTTCTTTTCTCAAGCCTTGTCTCTACTCCCTTCACTCAAAGCATTTCACTGTTTCCGCTTTATAA
 CCCTAGTATAAGTATCAAACTCTCACCTGTGACTTTTGCTCTCTCTACATCTCTCTTCTACTTTTAACTTTTCACTGTTTACAATA
 AGCTACCTTTTCTTATTTTCACTTCTCAAACTTCAGAGAAATCCCACTGCTTAGTGTCTTGGGAGATGCTAGAGGT
 TACAAAAATGCCACCTCCAGAGGTGAGGCAATTTTTTCTTAAAAAATAAAACCTTTTAGCCAAATACTTACTCATAG
 AAATGCTCAATTTATTTCTAGTAGTATCTTCAGAAAGATTTAGAGGTAATTGCATCTACAAAAAAGACTTAGTGCTAAGAAA
 75 ATGACCAATCCGATAAGAATATGTAATAAATAAAACATTTACTAATTTCTTTTTTTTTTTTTTTTTTTTGTGATGAGGCAATCTCCACTCAC
 CTGTGCGCCAGGCTGGAGTGCAGTGGTGGATCTGGCTCACTGCAAGCTCTGCTCCCGGTTTACGCCATTCTCTGCTCAGC
 CTCCAAGTAGCTGGAACACAGGCGCTCGCCACACGCCCGCTAATTTTTGTATTTTATAGTAGACAGGGTTTCACTAT
 AGCCAGGATGGTCTCGATCTCTGACTTTGTGATCCGCTGCTGCTGCGCTCCCAAGTGTGGGATTACAGATGTGAGCCATCCG
 CTTGGCCTTTTTTATTTTATTTTGGAGTGGAGTTTCACTCTTATCTCCAGGCTGGAGTGCATGGCACAATCTCCACTCAC
 TACAACCTCCGCTCCAGGTTCAAGCGATTCTCTGCTCAGCCACCTGAATAGCTGGAATTACAGGTGCCGCCACCATGCCCA
 80 GCCAGTTTTGTATTTTCACTAGAGATGGGGTTTTTCCATATTAGCCAGGCTGTCTCAAACTCCGACCTCAAGTCACTGCTGCTG

CTCTGGCCTCCCAAATGCTAGGATTACAGGCTTGAGCCACCTCACCTGGCCACTAAATCTTTTAAAAATCTCTTGAGCACACTA
 AATGATATATTGAATATAGCTGATGACCAATGGTGTGTAATAATCCATCAGGCCAGGTGTGGTGGCTCACTCTTAATAATCCT
 AGCATTCTTGAGAGGACGAAGTGGGAGGATCACTTGAGCCAGGATCACTTCAAGACCAGCCTGGGCAACATAGTGAGACCTGTCT
 CTCTCGAAAAAATAAATAAAAAAACATTAGGTGTGGTGGCCATGTCTATAGTTTGAACACTAGGGTGGCTGAAGGGGAGGA
 5 TTGCTTGAGCCAGGAATTCAGGCTGCAGTGAGCTATGACGGTACCCTGCACTCCAGCCTGGGCAACAGAGCAAGACCTGTCT
 CTTAAGAGACAATAAGAAATAAATAAAAAATCCATCAAGAATTTCTCTTAGGGTATAAAGCCAGAGACAAGATGAAAAATGGGA
 GAAATGTCCAGTGGTTCTCAACCATGTCTGACTGCACATTAGGATCATCTAACATGGTTTTTGAACACACCATACCTGGCCCCA
 CCACAGACCAATTAATCCAGACTCTCTGGGCTGGAGTCCAGACATCAGTAGCTTTTTTAAGCTCCTCAGGTGATTCTGTGTTTA
 10 GCCAGGTTTGAATAAATACTTAAGAAACCTGAAGAATAATACCAAAATGTCCGAAGTCTATCTAATAATACTTCTAGAAGTAGAG
 GACAGAGACATCAAGGAAAAGAAATAATGCTAGAAAAATTTTCTGGAGATTCTGCAAAAGACTTGTCTTCAGCAGTTAAGGCCAG
 AATATCAAGGCCCTGCAGGAATTAAGGAAAAGAACAGTACCTTGACATATCCTTCGATGGGTCTGAACCTCAAAATTAAGGA
 TTATTATGTCTTCAGAGAGAAAGATGGGAGCCACAGTGTGCACCTCGGAAGGAAAGAAACCTACCTGGCCTAACTGATCCAAA
 CACAGTTTCTGCTTTTTCCCCCAGATGCTGCTCTCCAGTGCATTCCTTAGCTCACTCCTGCTTTCTGGGGCTGACCCAGACCTA
 15 GAGCTTCTCCAGGCTCCTCGGGAAGAGCTGCTCTTAACAGTTGGTGTGTGGGAGGCAACTTCTCTCTTTGCTCTCTCTCTCGGT
 CTGACCTCATCTGCTGTGTAGTGTTCAGAAATCCCCCAAAGTTCTGCTTCAGTTAGGAACATGTCTGTTTTCCACCTCAGAGTT
 TTGCAGATTTTAAAAACTTTTTCTTGTCTATCCAGCATCTTCTGGGGAGAGGAAGTTGATGACTTAGTCTGTCTGTTCAACCTTT
 TTGAGGCCAAATAGGGTAAATCATATTAAAGGGAAATAATCCGTGATTACAGTTTCATCCTTTAGTATATAATGGTAATCTGAT
 AGTCTAATATTTCTGGGGTTTTTTTGTGTTTAAATAATCCTTGTCTTCTGCTTACTTGAAAACAGTAATTTATCCAACCTC
 20 AGCACTCAGAGTCAGGGGAAGTGTGGTCTCTTAGCTTTGTTTTCTCAGTAATTTATGTTCCGAGAAGAAAAATAAGTTTACCAA
 AGAATATCTTTCTGAAAATCTCTGTTAGTAGCAATCTGAGGCAAGACACTGATATTTTAAACAGAGAACAAATACAGTAAT
 TTACATAATATACATAGGGAATTTGGTAGATATGGCTTTAAATGACTTCTCATTGTTGGGGACCTGATAGTTTAGTTATGTTAACTG
 AATTTTTTAGTACACTGTTGATAAAATATTAAGTGTATTTCTCATTTTTCTGTTATGTCTCAGGTGTTTGTCTGACTACACTTTGGA
 GAGTGTATGCTTATCTGCCATGTCCATAACAGAACGAACTGTGTTCCCTTCTGATGCATTGGGTAGCAATTTCCGCTTTGGAC
 25 AGTTTCAGCACAGTAAGCTTTATCATAGATTAAATATCCATAGCTACATAGTGATTTTAAATCCAGAATAAATCTAGGGTGAGGAAA
 GAAGAAAAGTCTCTCTTATAAAATGGTGAACCTGTCTCAGTGTGTCTTACAGTTTTTAGGAATGTCTGTCTTACTGTCTTTT
 TTATATAACATTCAATCAAGGAAAAGTTTTATTGTTTTGTTAGCTTACAAAAACCTATACTCCTAATGGCTTAAGTGAATTA
 GGGGAAATATTTGGAAAATTCAGTTTATGTCTTTATCTTCCAGCTTTATCTGCTTTTGAAGTTCAAAAGTTGTTTTCTGTG
 TTTTATCTTTGTGTTTTAATTATTCATAGTACTTCTCTCATATGGACTCAGTACTACTGACAAGAGCCATCCTCTGAGATTACT
 30 AAGATGACTTGCATCCTTGAAGTGTGGAGCCAAAACATGAAGAGCTAATTCCTTTATCAGATGGGATTTAGAAAGCTAGTAAT
 CAGCTTATACAGGTGCGCTATTACTCGAATTTAAACAAGCCATTTGTTTTCAAAATAGCAAGGTGAGAACCAAGAAATGTTTT
 TTTTTTCTCTCTCTTTTTTTGAGAAAGAGTCTGTCTGTCAACCAGGCTAGAGTGCAGTGGCATGACCTCGGCTCACTGCAC
 CTCTCGCTCCAGGTTCAAGTGAATCTTGTGCTCAGCCACCCGAGTAGCTGGGATTACAGCGCTGTGCCACCACGCTGGCTTAA
 35 TTTTGTATTTTTAGTAGAGACGGGGTTTCATCATGTTGGCCAGGCTGGTCTCAAACTCCTGGCCTCAAGTGATCCACCCGCTC
 AGCCTCCCAAAGTGTGAGATTACAGGCGTAAGCCACTGTTCAGCCTGAAAACATTTCTTATTGACAGTATTTTCAATTAAAA
 ATTTAGCTGAACCTCAATATGATGAACATTCAAAAGAAAGCATTTGCTTTGGATGATTGAAAGCAAGTGGCAGATATCATGACACC
 TCACCCTAAATACTACAGCATGTGTCTCTATGAACAAGGATTAATCTGCTATAAAACCAATAACTATACATCTACATCTCCACCTC
 40 TCGACATATAGTAGTAATAAGCTAATATGCAGTCTCCTGTTCCAAGTTCTTATATTTTGTCCCCTAATCCAGGATCCAGCCAAGG
 ATCACTGATTACACTTGGTGTCTATATCTCTATAGTCTCCTTTAATCTGGAACAGACCTCCCGTCTCTCCTCTCTCTCTCTCTCT
 CTCTTTTTTATCTTTTAAGAGATGGGGTCTCACCCTTCGGCCAGGCTGGAGTACAGTGGCATGATCAGGTTCACTGCACTCTC
 45 AAATCCTGAGCTCAATCAATAGTCTCTTCCATCTCAGCCACTGAGTAGTTGGGACTACAGGTGCACGCCACTTTTTGTTCTTT
 ATGTTGTTAACTTTTTTCAAGAGTGTAGGCCAATGGTCTTGTAGAGTGTCCCAATCTGTTTTGTCTTTCTCTCTGTTAGT
 TTCAGGTTAAACATTTTTGATAGGGATAGCACATAGGTGATAGCACATCTAAATCACATCACTACATCATATTAGGAGACAGAGTA
 ATAGCACTTTTTTCAATTATGGTGATGCAGAGTTTGGTTATGATGCAGATCATTGTTAAAGTGTATCAGTCAGATTGTTTTAC
 50 TTGAAGGTCTTTTTCTTTTTTAATAAAGTAATCTGTGGGTACTTTCCCAATAACCTCTCAGCTGGTGGTTTTCAATTGTTT
 AGTGCTTTACACCCAGAGATCTATTGATGGATGTGAGCATCTCTGTGAATCCCAAGGAAATTTTTTGTGTGCATATATTTTTCCA
 GGCATACAGTCCAGGACCTCCAAATTTAAGAGATCTTTTCCCTCTGTTATCAAGGTGCGTTTTACAAGTTCTGTGCATCACA
 GAAGCATATTATAAGCAGTGGGTTCTAGAAGCTGGGAACCAATCCCGTCTCTGATTTCCTGATTATCTAGCTCACTCATGT
 55 AGAGCTAGGTACATAATTTTTGTTGTTGTTGAGAACGATTGTTCTGGCCTTTGCTTATCCTGAGCCAAACATTTGGATCTTTT
 ATGTTTGGATATAAGGCTACTAGAACTAGAGCAGAGACTTAGCCCTGGTTTTTGGTGTCTCATTTGAAGATTTTGGGGCAG
 AACAAATGGATTGTTGCTCTGTTGAACCTGAATAGTGGTCATTGGAATGAGTTAAAACTACAGATATATGTTTAGTTGTCTA
 ATTAGTGTGATCAATAAGACATTTCTGCAAGTGCAGAAAGACTCTTGACTCTGTAGACAAGAGGCTCAGGAGATGAGTTTA
 60 GGGGGCATTAAAGTTGTTATTAGCCTAATGTGTAATAGCTGAGGAGTATTCCTCTTGATTTCCTGCCCCAACAGGGCAG
 TGTGGAATTCATCATGGCAGTGGTTAGGTGTGTTTTGCTTAGCCTATGATTAGCCTGTGTTTACATTGGCTTGCTGCTGATGAAA
 AAATGTCTGTGAGGTGACTACCAATAACAATAAGAGCTAACATTGTAATAGTATACCTTAAATAACACATTATACCACTCAGAA
 65 GATTATCTGTGAAAAACAGATATTTTATTCTAATCACATAGGTAAAGGAAAAATCTTAGAGAAGTTAAGGTAGCCCAACATCAACA
 GCTTGTAAAGGACAGAGGAAGAACACCCCAATTCATTACAAATTCCTGCACTTTTTGTCTTACCAATCTCAAGGTAGGAGGC
 ATTCTAGGGAATCTAAATATGAACAAAGCATGGACCTGTCTGAAGGATCTTTTAAACCTAACAGGCGCATAGTCTTATGAATCT
 CTTACAGACAACAAATCGAGAGAAGAGCTAAGGAAGTACGTAAAGGGCAAAATGGCCTACAAATAGAGGGTCAAGGTGGTATGA
 70 CAGAAGTAGGATTTGAGAGAGGTGGATGTTTTGGAACAAGAAAGGAGTGACCAGAGAAGTGAATGGGAAGCACTGGGTTTTG
 TTGTAGAGGTGGAATGGCTAGTTTGGCTGGAGCATGAGCTGCATGAAAGAAAGTAAATAAAATAATGGCAGCTAGAATCAAA
 GATAGATTAGGGCCAGATTGTGAAGGGCCTTGAATGCCATGGGAAGCAATCTGTAGGTATTTTGGGCAGGAGATGAAAAATGA
 CCCTACAGAAGGCCCAAAATGATGATAAATGGTTAAATATGTTTAAAGTTACCAATCTATGCTAATCTTTAAGAAATGTTATCTC
 75 ACTGTAACATGAAATAGTGTACTGTGCCATTTGTCAGATGAAAAATGAAGGCTCAGCAAGATTAAAGGAACTGGAATGTCAAGA
 GCTGCAGCTAGGACCCAGACTTGGGTCTGTGTTGATTAAATCCTGTTCTGTGTCTCACTGTGATTGATATATTGTCACTCTTTT
 ATTAAGAACTGATAAGGTCTTAATCCTCTGTCAAGAATATGGCTGTAGAAAAGGATGTTTTCAAAGTTGTGGAAGGAGCTGCTCT
 CACCATTGTTATGTTAAGGAATGTAATCACTACCAACTGACTTGTACTGTCTGTGTTTTGAGACCAGAGCTAGATGGGAAATTA
 AAGAAATGGATGATGTTTTATTACATGCTGATGACATCAATACATGCTCATAGCAAAATGCCTTTGTTTTTCATTTTTCAGTATCTA
 AGCTTATTGGCCCTAAGTAAATCTTAGTTAGGTAGAGCTCAGTTCCAGGGGCAATCAAGATTCAATAAGAGTGAATTTTTTCC
 CAGCTCAAAATATTTTTCTTCTTACCAGGTTCTACTTAAAGACAATGACTACTGATGAAGGTGCCAAGAACATGAAGAAAGCC
 70 CCACAGCACTGTTGCTGAGCAGGGAGAGGATATTACCTCCAAAAAGACAGGGGAGTATTAAGGTGAGGCCACAAGCTGAGTG
 ACATACAAGGAAACCTGCTGTCTGGAAGATTATAGCATCTTTCTGAGGGGGCTGGGGTGGATAATGTTTATTGATGGTTACT
 AAGTGCCAACTAGAGCTAGAGCTAGATTCTCATTTTGTCTTCAAACTCAAGGTTTTTTTTAAGAGTTGAGTCTGTTATGTTGCCA
 GGCTGGTCTGAGCTCCTGGGTTCAAGTGTCTTCCATCTCAGCTTCTGAGTAGCTGGGATTTCTTTTAAATTAATTAATTA
 75 AATTTTTGAGAGAGGCGATCTCATTATGTTGCTCAGGCAAGTCTTGAAATCCTGGCCTCAAGCAATCCTCCACCTCAGCCTCTG
 AGTAGCTGGGATTATAGGCACGAGCCACTGTGCCAGCTAGAGATTTTAATTTTTAATCCAGATTATAGATGTTGAAATGAGAC

TGGGCTAGGTAATACTTGCCATAATCATATATCTTAGTAATGCAGATTACCTGGGGTTCAGGTCCAAGTTATATCTCACTC
 TAAAGGGCTATATTTCCCTATTCTCAGAGTATACAAATAGGTTACTATTTTAAATGTATCCTTTTAGTACACTAAAGCTAGCTAATG
 ACAATTTTGAAGACTTTTAAAGGAAGAAAAGCTAACTTGAAAAAATCAAAGGGGTTTATTTTATTTTATTTTATTTTATTTAT
 5 TTTATTTTATTTTATTTTGAAGACAGAGTCTCCCTCTGTTGCTGGGCTAGAGTGCAGTGGTATGATCTCAGCTCAGCTGCAACCTCC
 GCCTCCTGGATTCAAGCAATTCTGCCTCAGCCTCCCGAGTAGCTGGGATTACAGGCGCTGCTACCATGCTCGCTAATTTTGTGA
 GAGACAGGGTTTACCATTGTTGGCCAGGCTGGTCTTGAACCTCTGACCTCAGGTGATCCGCTGCTTGGCCTCGCAAGGTGTTGG
 GATTACAGGCGATGAGCCACGTCGCCGCCCAAAGGGTTTATTTTATATATAAATATGTTCTGCTGTACAGTGAAGATATCTT
 TTGCGATTCTCTTAGAATATATCTTACTTTTGAATTAGCTTTCCTACTTATTAAAGCACTATACAGTCATTACCATAATGA
 10 CATTTCAGTCAGTGACAGACTGCACCTCAGCAGTGGTCCCATAGATTATAATGGGGCCGAAAAGTTCCTATGGCCTAGTGGTGC
 CATAGCTGTTGTAGCATGGGTAGTACAGTGTATTATGTGTTTGTGGTGTATGTTGTTAAACAAACCTACTGCAGTCAGTCACAG
 TTATGTATAGTACATAAATCTTGATAATAAATGTTTATATTACTGGTTTATGTGTTTACTATACTTTCTATCATTATTTTAGAGTG
 TGCTTCTTATTTTAAAAAGTTAATCTGTAAACACCTTGGCTGAGTGCAGTGGCTCATGCTGTAAATCCAGCACCTTGGGAGG
 CCAAAGCAAGAGGATCACTTGAGGCCAGGAGTTCAAGACCAGCCTGGGCAACATAGTAAGACCCCTATCTGTAGAAAAAATTA
 15 AAAAAATTAGCCAGGCATAGTGGCATGTACTGTAGTTTCTACTACTCAGGAGACTGAGGCAGGAGGATCATGTAAGCTCTGGGAGTT
 CCAAGCTGCAGTGAACATGATCATACCCTGCACTTCTAGCCTGGGTGAGAGTGAGATCCTGTCTCAAAAAAATAAGAACAAACAA
 AAAACAGCCTTGGGAGGTCCTCAGGAGGTATTCAAGAAGAAGGCATTGTTATTATAGGAGACAGCAGTCCATGTCATGTTACTG
 TCCTGAAGACCTTCCAGTGGGACAGATGTGTTGGTGGAAAGACAGTGATACTGATGCTGACCCCTGTAGCTAGTGTATTATG
 TATGTGTTTGTGCTTAGTTTAAACAAAAAAGTTTAAAAAGTAAAGAAATAAAAAATTTAAAAACAGAAAAATGCTTATAGA
 20 ATAAGGATATAAGAAAGAAAAATATTTTGTACAGCTGTACAGTGTGTTGTGTTCTAAGTGTCAATACAAGAGTCAAGCTAAAAA
 AAAGTTTACACGTAAAAATGTTATAGTAAGCTAAGATTGATTTATTATTAAGAAAGAAAGAAAAATTTTAAAAATAAATGTTATG
 AGGTGTCCAGTGTATATAAAGTCTACGGTAGTGTATGGTAATATCCTAGGCCCTCATGTTCACTCACTGCTCACTCGCTGACTCAT
 CCAGAACACTTCCAGTCTCAGATTCCATTGATGTAAGTGTCTGTATAGGTGATACCAATTTTCTGTATACCTTTTATCT
 ACTGTACCTTTTCTAGCTTGTAGATATGCTTAGATACACAAATACCACTGTTTTACAATGCTGAGTATGCTGACATGACAC
 25 AATGTACAGGTTTGTAGCCTTGGAGCAGTAGGCCAAACCACTAACGTGGGTGTGTACAAGTAGGCCAGGCCATCTAGGTTTGTGT
 AAGTACACTCTGCGATGTTACATAAGGATGAATCATCTAAGAACACATTCTCAGAACATATCCCTGTCTTAAAGCGATGTCATG
 ACTGTGTGTTTCTTCACTCTATAGTTAATCATTTTCCAGTGCATTTCTTTGTTTGTGTTTCTTACAACATGTGGTGAGACAA
 CAGACATCTCTTGTATCTTCCATCTTATAAGTGAATAAACTGAATCTGAGAAAGGTTAAGTGGCTTATGCTCAATTAAGTATGA
 TTTCTCCTACACCATTGTAAACACATGTAAGTTTGTATAGTTAAGTTTGTGTTTCTCTGAAAGATTATCTGATGCACTTCTGAAT
 30 ATTACCAGGATGCTGAGTTTAAATATCTCTGTGTCAGCAGTAGCAAGTAAGAATTTTGTGTTTGTGTAACCTTGTATGTGAAA
 GCCTTCTGTGCTCGGATCTCTTCTGAATATGTGAATTGCTATTTATGTGCTAAGTCAAAATTTGGGGACTTGCAGCTATGAAATA
 AGGGCTTTATGCTATAGATTACATCTTATGTCTTTTTTAGAAGGCTTCTCAACCTTGTAGCTATAGTTACTCATCTCTAAATTC
 CAGGAAGCTTCTAGAAACAGTGGAGACTTTGACGGCTGTCTCAGCATCTCCCTGCTCTGTTTACGACTTACCTTTTCTATCTTT
 CAGATGGCCATGCCAGAGAACATGATCCCAACTGCTGCTCAGACCCCTGTTCTGTTCTAGGGAGTAAATCTAATTGCAAGATTT
 35 TAGGCTTATTAAGAAACATTGAGATTGAGGCCCTTAAATTTATATCATTATCATTTGTCTAGAGCCTCGGATTTACCATGAGG
 CTTTTGGTTAAGATTAAATAGGTCTAGTAAGTGTGCAAGCTAGGGCAATTTAGTTAACTCTCTGTGATTAGTTTCTGTTTGTGA
 AAATAGAAATAAATGCCATCAACCTCATAGATTATAGGATTAGGTGAAGCACTTAGCATAGTGCCTGCTCTCATAGTAATCTA
 TCTTATTAATATTACGTATTTTAAAAAAGAACAGTGTGTTTGGAAATTCAGTAACATCTGAGGAAGATAAAGATGGAT
 TTATATTTTAAAAATGAATAGAACCTAGATTGTGTTCTTAAGGCCAATCTAGATTAGGTACAAATTCATCTTGTAGGGAAGCT
 40 GAAGTGATACCATAGTACCATTGCTGCTGCTGGATGGCTCTGACTCTCTGCTGAGCCATTCACTCCCAATACCATGCGATTCTG
 ATAGTCTAGAAATGCGAGATTCTTCCACGTGAGGCTTACAGTTGAGCATAGCCTCCCAATACCATGCGATTCTGTAACATGA
 GCATTGTAGAAATATTGTGAATATCTTTTAGATTAAATGTTTGAAGACTTTTTTTTCTTTTGAAGTCTTAGAAGGCGAGTGT
 TTTCTTGCTTTAAAGAATATTGGGGCTGGGTGCGATAGCTTATACCAGTAATCTCAGCACTTAGGAGCTGAGCGGGAGAAAT
 CATTGGAATCTGAGGTTCCAAACAGCCTGGGCAATGTAGCAAGATCTCATCTCTACTAAAAATAAAAAATTTGGCAGGCGTGG
 45 TGGCATGTGCTGTAGTCTCTGCTACTCGGGAGGCTGAGGTGGGATGATCACTTGAGCTGAGTGATAGAGGCTACAGTGAGCTATG
 ATTGTACCACCGCATGCACTCTAGCTGGGTAAAGAGCAAGACCTGTCTCAAAAAATAAATAAAGATGTTTGGGCTTTTGTAGT
 TAAGAAAGCTGTGGAAATTAAGTTACAGTGTATTATGTGATTTATGTAGTGGAGCGTATACTGTAAAAAAGAAATTAGGA
 GCAATAATCGAATTATTTAAATAAACTCAAAGCAAACCTCTCCCAAAAGATGTTTATCAGATGTTAGCTACCATCTCTGT
 TATCTACCAAAATGATTAAATTTGGCATAGATTACAATTAACAAATTACACCATCACACACCTGGGTTTGAATTTCTTTCCCGAG
 50 AACTGACCAATACATTAGCAGCTTGCTCTGCGCAAGAACAAATAAATACACTGGATTTTACAGTAGTTAAATCTTTACTAGAAA
 ACAAGTTATTAGTATCATATCAAGCAGTGCAATGATACTCATGTTTTTACAGATAGACTATGTTTCAAATAATAGGAATGTAA
 CCTGTTTTACAGGAAATTTGGGCTTTCTGAAAAATAAACAGCAGAATCTAGTCAGGAGCTAATGTTTTAGCAAGAGGAGGAAATA
 AAATACACCTTTGAAGCTTTGCTTAAAGCTTTCTTTTGAATTTTAAAGTCCACCATTTCTTCTGGTCTAAGTCTGTTGATTA
 TGGACTAGCTCAAGCCTGTGTTAGAGAGTTTGTGTCGGGCGCGGTGGCTCATGCTGTGAATCCAGCACTTTGGGAGGCTGAG
 55 GCGGGTGGATCAGGAGTGTGAGAGTGTGAGACAGCCTGGGCAACATGGTGAACCCCATCTCTACTAAAAATACAAAAATTAGCT
 TGAGCCGAGATCGTGCCATTGCACTCCAGCCTGGGCGACAGGCGAAGACTCCGTCTCAAAAAAATAAAAAAAGAGTT
 TACTGTCAAAATATAGGGCATTAAACCAATGAACAGGATTTATTGGTTAATCTTTGAAGGAATAAATAGTGCATAGCAATAAA
 AGTAGATATAACATAAAGACAAGTTGGTAAAGGACAGTTTCTAAACATGAGTTATTGTGAGGAATGAAGGAGGCATTAGAAA
 AATGGATAATAGTATATTTGCTATCTGCTGGATGTTCTGGGATGGACTGTGTGACCTTTTATTCTCTGATTACAGTAAAAAG
 60 TTTGACCTCTTTTCTTAAATGTTTGTCTTTCTAGATTGTCAAAAGAGTGGGGAATGGTGAGGAACGCGGATGATTGGAGACAA
 AGTTTATGTCCATTACAAAGGAAATTTGCAATGGAAGAAAGTTGATTCCAGTCATGATAGAAATGAACCATTTGTCTTTAGTC
 TTGGCAAGGTAAGAGGTTATTTTGTAGTTGTTTACTTAGCTTTATTACTATTTGTAATATATAGGAGCAGAGGATTCTAT
 CCTTTCTAAAGTAAGAAATTTAGAGTAGTAGTACTCAAAGAAATGGTCTGAGAATCCCTAGGGCTCCCTGAGATCTTTTAGGG
 GGTCCCAATGTCTATTATTTTCATAACATAAGATATTATTGGCATTTTACTGTATTGACATTTATTGCACTGATGGGTAC
 65 AAAAGCTGCAGTTGTAAGAAACTGGTTCCTTAAACAAATCAAGGCAGTGGTAACCAAGCTGTTCCAGTAGTCAATGTTT
 CCAGTGCCTCTCTTCACTATTTACATAAGGAAAAAGCTAGTTTACGTAAAAATGCTCTGATAAAGCAGTAAAAATATTAGTT
 TTATTGAAACCAATCTTTGAGTTTCACTCATTTGATATTCTGTGACAGAAAGGGAAGCAGTGTAGAGCACTTCTGTCCCCCA
 AAGTATGATGGTTGCTCAAGSAAAGTACTTGTGCTCTGTTTGTAGTTAGTGAATCTGAACTAATCTTATTCTAGAGATACC
 70 ATTTTACTTGAAGGCAAAATCTGATTATGCAGACTGATTGAGTATTGTCAGGTGTTTCTGAGAAATGAATGGAGTAAGTCT
 GTCAATTCAGGAAACAACTGACAAATGTTTTTGGCATTAAAGTTTCAAGTAAAAATATAGTTTAGGAGAACTCTATTGGCC
 ACTGTGGGCTTATTGGCACTGTGGGCTGACAGCTTCCGAAGACTTTCTGATGAGATTGGTGGGTTAATGAATGATGGTTTAA
 AATATACAAATGAATGTGTCACATTTGGAAGATCTGATAAAGTGAATGATTTCTCAGTGACCAATGCAAGATGTACAA
 75 GATCATGTGTAATAACAAATTCATTCAAAGTTAGACCAACAGATTTTAAATGTAACAGTATGAAAGTTCAGTGATACACTTTCAG
 TTTCCACATGTAATTGACTTTTATGAATCTTCAAGTTGTACAGTTTGTAGTGTATCAGATAATTATATTCACAAATATCTAA
 AAGGTGTTAAAGGGCTCCTACCCTTTTCAACTATCTATCTTTGGGGTTGGATTCTTCTCTATGTACTTCAACCAAAATGTC

562

GGAGGCCAAGGCAGGAGGATCAGTTGAACCCCAAGGGTCAAGACCAGCCTGGACAACATGGTGAAACCCCATCTCTACAAAAATA
 CAAAAATTAGCCAGGCGTGGTGGTGACGCGCTATAGTCCCAGCTTTCTCAGGAGGCTGAGATGGGAGGATCAGTGGAGCCAGGAG
 GTCCAGGCTGCAGTGAGCTATGATCAGATCCCTCAGCTCCAGCTGGGTGACAGAGCGAGACACTGACTCAAAACAAAAATACATAA
 5 ATTAAGTTGTTTAAATCATGATTAGTTACTATTGGTAGGGATAGGATGATTATTAGAGCCCTTTATAGCTATTTTAAATAAA
 ACTAGGCCAGGCGTGGTGGCTCATGCTGTAAATCCCGGCCTTTGGGAGGCCGAGGCGGCGAGATCACCTGAGTTTAGAAGTTCAA
 GACCAGCCTGGCCAAATAGTGAACCCCTGTCTCTACTACAAATACAAAAATTAGTGGTGGTGGGACATGCCTATATATCCAG
 CTACTGGGAGGCTGAGGCGAGAGAATCACTTGAGCTGGGAGGTGAGGTTGAGTAAGCCGAGATTTGTGCCATAGCATGCCAGCC
 10 TGGGCGACAGAGCAAGATTCCATCTCAAAAAACAAAAACAAAAAACCTAAAAATATATGAGGAAAGGTATACAGGAAAAATAT
 TTGCTTTATTAGTATAAAAAAGAAAGGATTTCTGTATTATCTGTTATATGAGGTTTTCTTATTTTAAACATAAAAAATTAGCA
 GAATATGCAAGTAGTTAAATAGAGATCAGAAATTGGTACTGAGTCTAGGAATCCCTCAAGGAAGGTGAAGCAGGAATGAATCAG
 ATGCATTTTTATTACCTGAAGCTTATTAGTGATTAACTTGTGTCAGCTTTTATATTGAAAGGAAATCTTTACAGTTAAAA
 TATTTACCTTTCTGTTCTTTCTACTCCCATATGAAAAAGTAATTTTTTTCTGTATGATATGGTGTAGCTTTTCATCCTATAGTG
 TGTTCAAGATGCTCATATTCAAATGTAAATGTACATTTAAAGGTAGTGATTTTTCAACAAGGGTGCCAGACCATTAGTGGGAG
 15 AAAGAACAGTCTTTTCAACAAATGGTGTGGAAAAAGCTAGATATCCACATGTAAAAGAAATGAAATTTGGGTCTTATCTTACACCAT
 CTGCAAAAAATTAACCTCAAAATGGATCAAGAGCTAAATGCAAGATCTAAACCTTGCATTAGAAACCTTCCCATAGAATATGGAGG
 AAGGCCGGGACAGATGGCTCACACCTGTAATGCCAGCCTTTGGGAGGCCGAGGCGGCGGATCACCTGAGGTTAGGAATTCAGA
 CCAGCCTGACCAATATGGTGAACCCCGTCTCTACTAAAAAAGAAAAAAGAAAAAATAGCTGGGCATGGTGGCGCATGCCCT
 ATAATCCAGCTACTTTGGGAGGTGGAGGCGAGAGAATCGCTTGAACCCGGGAGGCAGAGTTGTCAGTGAGCCAAGATCACACCAT
 20 GCACTCCAGCTAGGCAACAGAAACGAACTATGTCTCAAAAAAGAAAAAGAAAAAGATAAGAAATATGGAGGAAGGCTTCAT
 GACATTGGATTTTGCAGTGGTTCTTGGCATGACATCAAAAGTACAGGCAACAAAGTAAAACAATTAACATAAAATCTGTACA
 TCATAAATTAAACATAAATTAGAATACATCAAAATTAACCTTTTGTGTCATCAACAGTAACAGAAATGAAAGGCAGCCTATGGAA
 TGGGAGAAAAATGTTGCAAACTTTATATCTGATAAGGGATTAATACCCAGAAATACACAAACAACTTCTATACTCAACAAAAACA
 ACAAATAGCCCAATTTAAAAATGGGTAAAGGACCACTGTCAGTGGCCATACCTGTAATCCAGCATTTTTGGGAGACCTAGGTGGG
 25 AGGGTCACTTAGAGCCAGGAGTTCAAGACCACTTGGGCAACATAGCGATACCTGTCTCTAAAAACTTTTTAAAACTGGGCAA
 AGGGCTTGAATTTCTCAAGAGAGATATAAAATGGACAACAGCATATGAAAGATGTTCAACATCACTAATCATTAGGGAAT
 CGAAGTCAAAACCAAGTGAAGTATTACCTCATACCGGTTAGAATGGGTACTGTTAAAAAAGAGAAAAACAAGTGTGTATGA
 GGAATGAGAAATTTGAACCCCTTATGCGCTTGTGGTGGAAATTTACGTTTAAAGAAAAATTTGGGAGATGCTTAAAGTCTTCT
 CAAAAATTAATAATAGAGTTACCATGTTGATCTAGCAGTTCTACTTGTGGGCATATAACCAACAGAAATGAAAGCAGGGTCTTGA
 30 AGAGATATTTGTACACTCATGTTGTAGCAGCATTATTAACAGCAACCAAGGTGGAAGCAACTCAAGTGTCTTCAATAGATGA
 ATAGATAAACCAAAATGTGATATAAACGTACAGTGGAAATTTACGTTTAAAGAAAAATTTGGGAGATGCTTAAAGTGTGAGC
 CCTTGAGGGCATTATACTAAGTGAAGTAATCCAGTGACAAAAAGAAAGTACTGTCTGATTCCACTTATATGAGTTATCTATCCAG
 AGTAGTCAAAATTCATAAAAAACAAGTAGAATAGAAGTTGCCAAGATTAGGGAAGGAGGAATGCTTAATGGGTATAAAAATTTAG
 TTTTGCAGATGAAAAAGTTCTGGAGATTTGGTTCACAACTAGTGAATATACTTAAAAATAGTGAACCTGTGCACTTTAAATATAGC
 TAAGATGGTAAATGCTTTTTTTTATCCCCCACAATTAAGCGTTTTTTTTTAAACTCAAGGAGAAAAATATGTAGTCAGAAATGT
 35 TCTGAAGTGGTCACTATAGTCTTTACTATAAATGAACTGTTAAGTGATTAAAAATGTTGTATCTTAAATATGTTATATATTTT
 TTTACCTGCCTATAGTTACATACGTATAAAAAAGCATTAAATTTAGTAATAGCTATATTATACATTGTTATACATATATATTCT
 TGTTTTATTTTTATTACAAATGGAATAGACTCCTGAAATGATAAATTGTGTATAAGCTAGTAAAACTGAAAGTCCAGATCAAGT
 GTAAGAATAAATTTAGCGTGGCCAGGCACGGTGGCTCAGCCTGTAATCCAGCCTTTGGGAGGCTGAGGCGGCGGATCACGAGG
 40 TCAGGAGATCGAGACCATCTCGGCTAACAGCATGAACTCCATCTCTACTAAAAATACAAAAATAGGCAAGTGGTGGCTAGC
 GCCTGTAGTCCAGCTACTCGGAGGCTGAGGCGAGAGATGGCGTGAACCCGGGAGGCGGAGCTTGGCGTGAGCAGAGATAGCGC
 CACTGCAACCCAGCCTGGGCGACAGAGCGAGACTCCATCTCAAAAAATAAATAAATAAATAAATAAATGACATTATGTATTC
 TTGGTGTGTTTTTTTTTGGAGCGAGTCTTGCTCTGTGCGCCAGGCTGGAGTGCACTGGCGCAATCTCGGCTCAGTAAAGTCCCG
 CCTCCCGGTTACGCCATTCTCTGCTCAGCCTCCGAGTAGCTGGACTACAGGCACTACCAACAGCGCCCGGCTAATTTTTT
 45 GTATTTTTAGTAGAGCGGGATTTACCGTGTAGCCAGGATGGTCTCAATCCTCTGACCTCGTGATCTGCCCACCTCATCCTCCC
 AAAGTCTGAGATTACAGGCGTGAGCCTGACCCGCTGCTTCTGGTGTATGTTACCTATGACTGAGATCTGAAGATGCTTAAAGT
 TCTTTAAATGTTTATGCTTTGGGGTGGGCGATGGTGACTCACACCTGTAATCCAGCCTTGGGAGGCGGAGTGGGCGAGACC
 ACTTGAGGTGAGGAGTTGAGACAGCCTGACCAACGTGGTGAACCTGTCTCTACCAAAAAATACAAAAATTACCTAAGCGTAG
 50 TGCCAGTGCCTGTAATCCAGCTACTTGGGAGTCTGAGGCGAGAAATGCTTGAACCCAGGAGGCGAGGTTGCAATGAGCCAA
 GATCGTCCACTGCACTCCAGCCTGGGCAACAAAGTGAAGCCGTGCTCAAAAAAGAAAAATATTTATGTTTTTGGTCCAGTAAT
 TCTACATCTAGGAATTTAACTAAGGAATGTGTAGAAGCTTGCTTAACCTCTCCAGCTAATGTATGCTCTCCATTCTGTTTGC
 ATATATACTGAGTGATACAACTGGTTTCTGTTCTGTGGTGGTCTCACACATTGCTCCCGTCACTGAGTGGGCTTGTCAAGTGC
 CTGAGCCACAGACCACTAGGAACACACCTATAGTTGAACAGCTGGTTTATTACTTGTGAGGGAGGATGCACACCATGCGAAT
 55 GTGGAGTATCTCAGTAAGAGTGTAGGAGGAATTTTATAGGACTTGTGCTTGTATTAGGTGATTGTTGGGAGTTTAAAGAAAGCA
 GAGCTTTCTCGATTGGATGCTGTTAGGATGTGGGGTGAATGATGTTTGGGTATCTTAATAAATCTTATTAGGACGTGGGCCAACTA
 GAGTAGAGTGAGACCAAGCTAGAACTGGTAGAAGCAGCAGTCACTCATATTAGCCAGGAGAGGGGATGTTTGGTATTTTGTG
 AAAATGCTCAGTGACCTTGTTTTTTCTCTGGGCTTAGACAAAAAATTTTTTTTCTTTTTTGAATGGAGCTGGGGTGAG
 TGGCGTGATCTCAGCTCACTGCAACCTCCAGCTCCAGGTTCAAGCAATTTCTTGCCCTCAGCCTCCCAAGTAGTGGGATTACAG
 60 GCGTGAGCCACCGTGCCCGGCCAGACAAATTTGAAGTATTTTGTGTTTGTCTCACTTGAACACAGTCTCAGAGTGACCTTGTCT
 CATGTTGATATTTTGGAGATGTTTATGTCCACAGGAGAATAATATGGCTCCCTATGATCCCTAGGCCAGCTTCAACAGCAC
 TGAGGTCCAGCTGTAAGTGTCAAGCAGTTCCAGACGTTGGGAGGCTTTTCTTTCTCAAACTCTGTTAAGATCAGTTGAAG
 CCAGACCTGTGTCTTAAAAAGGAAAAAACTGGGCTGATGCAATGGCTCACACCTGTAATCCAGCCTCTGGAAGCTGAAGCA
 GAAGTATCACTTGGGCTAGGAGTTCAAGACCGACCTGGGCAATGTAGCAAGATCCATATCTACAGAAAAATCATGGTGGTATTCA
 65 CCGTAGTCTTAGCTACTAGGAGGCGAGGCGAGGATTTCTCTTGAAGGAGGCTCAAGACCACTGGGCAACATCATGGTGGAG
 CTGCTACAAAAAAGAAAAAAGAAAGAAAGAAAGAAATAGGCCAATGTGGTGGTACATGCTGTGGTCCAGCTACTTGGGAGG
 CTAAGGTGGGAGGACCGCTTGAAGCTGGGAGGTTGAGGCTGCAGTAAGCTATACTCACATATTGCACTCCAGTCTGTGTGACAGA
 GCAAGACCTGTCTCTTAAAAAAGAAAAAAGTGAATGAGCAATTTCTGTAAGACAGTGGGCAATTAATCAAAATTAATGCA
 70 TATCACTTTGCACTTCCAGGAATTTACATTTCAAAATATACCTTATGCAAGTAGGCAAAACATACATGGACAGTAGTCTCATTA
 TTACTGTTGGTAATATATGCATCAATAGAAGATTGTAGTATTATACCCATTAGAATGAGGTAGGTCTATTGCAATTTATTATG
 ATGATGATGCTTTCTTTATCAATACATATTATGTGCCGGGACCGTGCCATGCAATTTGATGTTTATCTAATAACTCTTTA
 TTTATTTATTTTATTTTGAAGCGAGTCTCGCTCTTCCGACGCTGGAGTGAGTGCGCTATCTCGGCTCACGAAAGCTCCCT
 75 CTTCTGGGTTACGCCATTCTCTGCTCAGCCTCCGAGTAGCTGGGACTACAGGCGCTAGCCACCGCTGGGTAATTTTTT
 GTATTTTATGAGGAGATGGGTTTCCCGGTGTGAGCCAGGATGGTTTGCATCTCCTGACTTTGTGATCGGCCGCTCAGCCTCCC
 AAAGTGTGGGATTACAGGCGTGAGCCACACGCCCGGCTTATCTAATAATTTCTTAAACAACTATTAAATATATGGCAAGTACTG

564

565

5 GAATCCTTCCCTTTATAATACGGCCAGACAGCAAGAATCATCAGCAAATATCACGAAAAAGCAGCACTAAAAATGGACTAACAGAA
 GAAGTAGAAGAGAACCTTAAAAATACTAATTATTGTTCTTCAGAAATGTTAACAGGACATCAGATTCAATAGTCAAAAAGCCAAT
 TCCTGAAAAAGGAAAGGGAGGACAAGAAAGTTTCTGGAAAGTTAGAGCATGATTAAATCAAACTGAAACTCAGAGGAAGGGTTGAA
 GAGCAAAATGGACAGTCCCTGAAATCAGGTGATCTGAAAGATAGCCAAGGATTTCTCAGAACACAGAAAAAGAGGATGAAAAG
 10 TGAAAAAGAAAATTAGAAATATGGATAATAAATCCAGGAGAGGTAATATGCATCCAATCAACATCTAATAGAAAAATTTCTACAG
 GGAATAAAGAAAAAGATTCTTAAGATCGAAGGGCCAGTGTAGTGGTACCAGGAGGAGGAGTGGTTTTCCACCCAGATATA
 TCCTGGTGAATTTCTGAATTCTGCAGCTTACAAGAAAATCTGAACCTCTCCAGGGAAGAACAGCTATGTACAAAGGAATAAGA
 15 ATCTTATTCATTACACTAAAGACAATGCTTTTGATCATTGTCTATAGCTATGTGATTTTGAACCTAGAAATCCGTACTCAGCCCA
 ACTGTCTATTATGTATGAGAACAAAATTAACCTTTTGGAAATTTGCAGACTCATATTCTTTTCGAAAAAATACTGTGGGATGTACC
 AAAACAAAAAATAAGTCAAGAGCAACAACTCAAGGCATAAGAAACAGTAGCGAGAAAAAATAATTTCCATATTGGATACA
 20 TTATCTGTAAGATCTCTGAAGCAGTAGAGCTGTAATGTTAGAAAGTAATATTAAATAGAAACAGTCTGGCCTGGGCAAGTGGC
 CCACACCTGTAATCCCTACACTTTGGGAGGGCGTCACTTGAGGCCAGGAGTTCAAGACCAGCTGGCCAAACATGGCAAAACCCCAT
 CTCTAGTAAAAATACAAGATTAGCCAGGCATGATGGCACATGCCCTATAATCCAGCTACTCAAGAGGCTGAGGCAGGAGAAATCAC
 TTGAACCCAGGAGACAGAGTGGCAGTGAGCCAAAGATTGTACCACTGCCCTAGGTGACAGAGGGAGACTCTGTGTCAAATAATAAT
 25 AATAATAATAAACAATAAATACAGTCTGGATTCTGGGTTATTTTAAACAAAGGTGGTGAAGATAGGAAATGAAGAGGGGAAGGCA
 AAATGTCTAAGATTATTTCTTTTAAACATTTTGGAGATGAGGTCTGTCTGTGGCCAGGCTGGCATGCAGTGGCACACA
 GTTGTGGCTCACTGCAGCCTCAAATCTGCTCCCTCAAGCCATCTCCACCTCAGCCACCGAGTAGCTGGAACCTGCAGGTGCACA
 30 CCGAGCTAACTTTTATCCTTTAGAGACGGGGCTTGTCTATTTGCTCAAGCTGGTCTTGAACCTCAGGCGATAAGCGATCAG
 CCTGCTTCAGCCTCCCAAGTAGTGTAGATTACAGGCTCGTGTACTACCACAACAGCTGCCTTAATTTCTTGTTCAGGGGAGATT
 ATGCTGATTAAATCTTTTATTTAAGATTCAAGGGGACATGTGCCAGTTTGGTACATGGATATATTGTCTGTAATGCCAGGTTT
 GGGCTTCTATTGAACCCATCATCCAGATAGTGAACATAGAATATAGCCCTTGATCCCTCCATCCTTTTGGCTTTGGAGTCCCC
 35 AGTGTCTCTGTCTCATCTTTATGTCTGTGTATCTCAGGTTTAGTCTCTACTATAAGTGAGAACATGCAGTATTGTGTTTTCT
 TGTTCCTGTGTTAATCTAGTTTACTGGCTCCAGCTGCATCTGTGTGTGTAGGGGACATCCTTTCATTCTTTTATGGC
 TGCATAGATTCTCATGGTATATATGTACCACTTTCTTTTATTTTCAAGTCTGTCAAGCTATTCTTTATTTTCGGAGA
 GAGGGCAGGGCAGAGTGTCTAGTCTTGGCAGCGCTTTTGTCTGTGTGGCAGGACATTGTCTCAGTCTCTCTGTCTCTCTTGG
 40 TGATCCCCACCTTGTCTTGTGAACCTTGGAGGCCATTTGTCTTGGAGACCTTCAGTAACTCCATGGTGCACCGCTCGTATGG
 GGTGAAGCCACAGCTCTCAGATCATGTCCCGGCAGAACTGGTATATTGGTCAGGTGCCTGCAGCAGTGGGATGGTCACTTG
 TCCTCATGTTCTCGGTACCTTGTGGCCCTTGTGAGGCCATGGCCATAGGCGAGCACAGAGCCATGGCCGCTGCTCTCAATGG
 TGGCCGTGGCAGAGGAGCCACATTTTATCCAATCCACCATGTATGGACACCTAGGTGACTCCGTGCTTTGTCTATTAGAA
 45 TATAACTGTCTTAAAGTAAGTGTGTGTGGCTCATGCCCTGTAAATCCAGCACTTTGGGAGGCCAAGGTGGGATGGTCACTTG
 AGCCAGGAGTTTAAAGACCAACTGGGCAACATAGTAAGACCCATTTCTACAGAAAAAAGGCCAAGCATGGTGGTGCAT
 GCCTGTAGTCCCGCTACTCAGGAGGCTGTAGTGGGAGGATCATTTAGTCACTTTATACCACTGCAGTCTAACCTGGGCAACAA
 AGCGAGACCTGTCTCAAAACAAAACAGGCTGGGCGTGGTGGCACATGCTGTAATCCTAGCACTTTGGGAGGCTGAGGTGGGTGG
 50 ATCATTGAGGTGAGGATTCAGAGCTTACAGCCAGCTGGGCAACATGGTGAACCTGCTCTACTAAAAATACAAAATAGCTGGGTGT
 GGTGGTGGGCGCTGTAGTCCAGCTACTTGGGAGGCTGAGGAGAAATGCTTGAACCTGGGAGGTGGAGGTTGTAGTCACTGAG
 ATTTCTGCCATGCAGTCCAGCTGGGCAACAGAGTGAAGTCTGTCTCAAAAAACAAACACACAAACATGCTGCAGTAAAC
 ATGTCAAGTGAATGCCAGCTATCTTTCTGATAGAACGATTTATTTTCTTGGTTGTATACCCAGTAATGGGATTCTGGGTCAA
 55 ATGTACTTTGATTTTATGTTCTTCGAGAAATTTCCAAACTGCTTTCCACAGGAGCTGAATTAATTTCCATTCTCATCAACATG
 TTTAAGCATTTCCCTTTTCCACAACCTTGCCAACTCTGTTCTTTTGTACTTTTCTTTTCTTTTCTTTTCTTTTCTTTTCTTTT
 TTTGAGACGGAGTCTCATTCTGTGCGAGCTGGAGTGCAGTGGCGCGATCTTGGCTCACTGCAACTCCCGCTCCAGGCTTCAG
 60 GCCATTCTCCTGCTCAGCTCCGAGTAGCTGGGACTACAGGCGCCACCAACAGCCCGCTAAATTTTAAATATTTTATG
 TGAGAGCGGGTTTCAAGCTGTAGACAGGATGGTCTGATCTCCTGACCTCATGATCTGCCTGCCTCGGCTCCCAAGTGTCTGGG
 ATTAAGGCTAGTCAAGCTCAGCGCCCGGCTGACTTTTATTAATAGTCACTTCTAGTCACTAGTTGTGAGATGGTGTGTTGGT
 65 TTTGATTGCAATTTCTGATGATTAGTGTGTTGGCATTTTTCATGTTCTGTGGCTGCTTCTCTGTCTCTTTGCTACTTTT
 TAATGGGCTATTGCTTTTCTTGTGATTGTTTAAAGTCTTTTCTGGATATTAGTCTTTGTGAGATGCATAATTTGCAAT
 GTTTTCTGCTTCTGATTTTGTCCATCTGTTGATGCTTATTTGCTGTGCTGAAGCTCTTTAATAGTCCCACTGT
 CAGTTTTTCTTTTGTGCAATTTGATTTTGGGACTTAATCATAAATATTGCTAGGCAATGCCAGAGAGTATTCTTAGCT
 70 TTTCTCTAGGATTATATAGTTTCAAGCCTTACATTTAAGCCTTTAATCCATCTTGTGTTTGTATATGTTGAGAGGTG
 ACGTCTGGTTTCTATTGATGCTTTTATTTCTTTCTTCTGCTGATTGCTCAGGCTAGGACTTCCGCACTGATGCTGTG
 75 GCTCAGTACCATGCTGAATAGGAGTTGTTAAGAGTGGACACCTGTTTTTCCAGTCTTAGGCGGAATGCTTCAACTTTTGCC
 CGTTCAGTATGATATTGACGGCTGGGTGAGTGGTTCACACCTGTAATCCCAAGACTTTGGAAGGCCGAGGAGGAGATTGCATG
 AGCCTAGGAGTTCAAGACCAGCTGGGAGCATAGTGAACCTTGTCTCTACTAAAAATAAAAAAATAGCCACATAGTGGCA
 TGCACCTGTATCCAGCTTACTTGGGAGGCTGATGCAGGAGTCACTTGAGCTGGGTGATACAGGCTTCGGTGAATGTGTT
 GCACCACTGCAGCTCCAGCTGGGCAATGGAATAAGACCTTGTCTCAAAAAAAGAAAAAAGATATTGTCAT
 80 AGGTGGCTCTTATTTTGAAGTATGTTCTTTGATGCTTAGTTTATTGAGGGTTTTTATAATGAAGGATGTTGGATTATT
 GAATGCTTTATGCTGATTGATTCTGAACATTGATAAAGAGGTATATATATATCTTTAAATGATTGTTCAAGCTTTAATGGAAA
 GTACTAGTAAGATAGCATGTAGAATTTCCAAATCACCCATGTGGAGTGGGAAATAGAGGAACAGGAAAACTTCATCAATTGA
 GCAAAAATTTGTTTAAAAAATAAGAAAAACAGGGCCGGGACGGTGGCTCAGCCTGTAATCCAGCACTTTGGGAGGCCGAGGCA
 85 CGTGGATCAGAGGTCAAGAAATCGAGACCATCTGGCTAACATGGTGAACCCCATCTCTACTAAAAATACAAAAATAGCTGGG
 CATGGTGGCGGGCGCTGTAGTCCAGCTACTTGGGAGGAGGAGATGGCGTGAACCCGGAGGTGGAGGTTGTAGTGAAGCCAG
 ATCACACCACTGCATCCAGCCTGGGCAACAGAGCGAGACTCCATCTCAAAAAAAGAAAAACACTGTGTAGAAAAACCAAGAC
 AAGAAATAAACCACTCATATCAGTGATTACAAAAATATGAATGGGATAAAGTCACTTAAAGGCAAAAGTCTCATAAAGTGA
 90 GAACAACAACAGTATCTAGCTATGTGTTCTTTATAAATGAACACTAAAATCAAAAGGTACCAAAATGAAAATAGAGGAAAGA
 TTACGTCTGCCCATATTGAGATCTGATGGAGCTGTGAGACTTTACATTTTGTGTTTTCATATGCTTTTGAAGTATTATGAATGTC
 CTGGGATATAAGTCTAGGAATAGGAGCAAACTTTGAAACCAATTTATATATGTTTCAAAAAATATGTAATATGGTACTGGT
 95 CTAAGAGTGGCAGTGTATTCTTTCAAAATTTTGGATTATATAATTTCTTCTTCAAAAAGTTATCTTCAAGTCTTCAGGTA
 GAATAAATCATAGTAGAAAAATAGTCTTTCTGGCCAGCATGGTGGCTCAGCCTGTAATCCCAACACTTCGGGAAGCCAGGTG
 GGAGGGTTGCTTGGAGCCAGGAGTACAAGACCAGCTGGCAACATGGTGAAGCCCATCTTAAACAACAACAACAATAAGCC
 AGGCGTGGTGGTGTGCTGTAGTCCAGCTACTAGGAGGCTGAGGAAGGAGAGTGTGAGTGTGAGTGTGAGGCTGCAG
 100 TGAGCCATGATCACCACTGCATCCAGGCTGGGCAACAAAGTGAAGCCCACTCAAAACAAAAACAATAAAGAGGCCGGGCA
 CGGTGGCTCACACCTGTAATCCAGCACTCTGGGAGGCCAAGGCTGGAGGATCACTTGAAGTGGGAGTTCAAGACCAGCTGGCC
 AACATGGCGAAGCCCATCTCTACTAAAAACAACAATAATAGCTGGGCAATGGTGGTGGGCGCTGTAGTCCGAGTCTGGAGT
 105 CTGAGGCACAAGAAGTCTTGAACCTGGGAGGAGATGGTTCAGTAAAGTGAAGTTGTAGTGAAGCAAGATCAGCCACTACCT
 CCAGCCTGGGCAACAGAACGAGACTCTGTCTCAAAAAAGAAAGAAACAGTCTTTTGTGCTGCTGCTGTTGTTGTTTAC
 110 AAAAAAAAAAAATTCAGCCAATTGGCCATTTATTTAGAAATAGTATTAATAAACAAGTTTCCATATCAATAAATAATTTGTA

TAGCTTCCTAGAATTTATTAAAAATAGGAATACTAATAGATTCAAAAAGGAAAAATTTGTATAAATTAGTGAAAAATTACCACCTGTCT
 CTTAATGCCCTATTTTAAGATTAGTCATTAATAAATATTTACTTGTCTGGCCCTGAACTCTGTCTGGGTACTGTGAGGCACAAAA
 GAAGTACAGAATACTGCCTTTGCCTACTAAGAATTTTATTCATCTTTGACAGCTTTCTGTGTGAACAGTAAATGTTTTCTTAC
 ACAGAGCTCTAAAAACATGTTAATCTGGTATAATTTACCCTAGGCACAGGAAAAATAATTATAGCTAACATTCCTTTAGTTTGTCT
 5 CTGTATATCCACACTTAACAACAGCATTTTTCACATGATAGACACCTGACATATGAATGAATGAATGAATGAATATCAGGTGCTAG
 ATTAAGAAGCTCTAATTCAGTATCTAATTTAATCTCTCAACAATTATCATTAGCTAGTGTATTATCCACATTCATCAGTGAAGA
 AACTGAGCTTCAGATCACTTTAATTACCTTGCCCAAAGTCATAATTGAAGTGGCAGAAATGGGACTGGAATCCAGGTCTAACTCAAG
 TGCTATAGTGGTGTGAAGGGAAGACTGGTAAGGGTTGGTGTTCATGGAGAATTTGTTGCTGGGTGTATCTTCTTGTTTAGATTTT
 10 CTGTTTTGAAAAACATTCAAACCTTGATCAACCAAAAGAAATCATTTGCATAAATGTTATTAGTTCAGGAGCCAGGTTCCACGCCT
 GTTAGCATCTGTCCGTGAGTCTGTGAAGCAATCTTACAGTGGTGTGTGTTTCATCTAAGTAGTACAAAACAGTGCAGAGGAGGAAG
 GCGGACAGCTTAGGGGAAATCTGACCACCATGCGTGTGGAAATATTTCTCTTGTCTCCTGCTTTTGAAGAGCCATCTCTGCTTG
 CTTTTTCAGGGGGTTATTAAGATCCTACTCTCTTGGATACTGTGCTCTATTAGGCAGGAGACACAGGCAGAAAAGAGCTCACTTGG
 CATGAATTAGGCAACAGAGAAAACTCTTGCTCAGTGGGAGTAACTGTCAACCTGGTTTTCTCTGGCCAGATAACCACTCTGT
 15 CGAGTAGTAAGTCCATTACAACATTCCCAATTCAGATCCTCTAGCCAGTAATGTTTGAAGTGAAGTGCAGGCTATCAGACAC
 CACTACTATAATTAGAAAAGGAAAAATAGACACTTACCAAGCTAATGTCTTAGGCTGGAGCATTTACAGCTTTTGTTTTTT
 GTTTTTTAAAGTTATGGAGCCTCTTCTCAGTTTGTCTCTCAAAATACAATTCATGGTTTAGGGGTTCTTGCATTTCAATTTTTG
 TTAAGTGTGACATCTCTTTCTTTTCCCTTATTTAATCGGAGTACAATTCGTGTGACACATCGAGTCTATGCGCCAT
 20 CCACATTGAGAACAGGGTGTCTGTGCTCTTCAAAACAAATTTGCTCTAGGCGAGTAAAGAGAACAAATAGTCAGAGCTCCAGTTTA
 AGTGAATGTTTGCAGCTCGCTGTGATGTGGTTACACTCCGATGGCGAGCTAAGCTTGGGTAATTTGGTTTGGTTTGTGTTTGGG
 GATTGGAGGACCTCCCTCCCTTTAAGTTACATGCTCTTAAAGTCAAGAAAAAATGTTGTCTTTTAACTGTTTATTCT
 TTCTTACCAAAAAAGCCCTAAGTAGAAGCATCTGTATGTACTTTTATTCTCTTTGGGCATGTATAGATGATTTACTTCCCGTA
 AATCATGCTGGTGGGATTAGCAACAGACCTCTGAGCCCTACAGGCTGCACTCCCACTGAGTCAAGTGGTTATTATTAATATTT
 25 TATTAAGTTAGTATTTGCACTAAAAGATGCCAGGTCAAAAGCAACCAAGGCTTCCACAGCCAGAGCTGCCATGGTTTGTGTT
 TGTTTTTGGTAGGAATTTTAAAGTAAACATTAAGAAATTAAGTGGAGCTATAGGAGCTAGGCTCATCTGCATCTGTGTACCG
 CAATCAGGGCCCCCTACTGTGGCAATCAGCAGTCTTCCGTGGCTCAGAGTGGTGTGTGAGTCTTGTGAGCAGTCTCGTAGAACCT
 30 TCCACATCAGGTGTTCAAGTTTAGAAACAGTTAACCCAGCAATGCCCTTGTCTACTTGTAGATGTAGAGAAATCAATGGGCTGTAT
 TCACCATGAGCTGTGATACCTCTTTTACTCTGACATCCGAATGTTGTGAGTATTACAAGGCGATGGTTTGGTTTGTATATA
 AACTGGGGTGTATATGTCTGGATGTATATCCGTTTAAAGTTTATAGTACTGCAAGGTTCAATTTGTGAAGGGTTAGATTTACCAGG
 AAAAAAAGATTAGTCCACATGTAAAGTAGAAAAATTTTATAAGAGCTATCAAAATGTTTACTGTCTATTACAGCATCAGACAC
 35 TAGTCTGTGTCATTTATTGTCTCTCTGAGAGACTAGCTACAAGTGAATGTTTGTCTTCTTAATTTAGCTTTTGTACAGTTGACT
 TTTTTTGGCATGGTTACTTCAATTTATCTTCCCAACATGTTTATTAGTAGCAATCTTTTCCCTCACTAATGATGGGTATCAC
 ATCTAAAGAGAACTCTGAAATTACTCATTTAATTTAATATCAAGTACATACATCAAGCTGAAAAACAGCCTAGGAACTAAGCG
 ACAGGCAGGAATCCTTGCAGAGTCTCTGGATTCCGTGTTTGAAGAACATTCAAACTTGATCAACCAAAAGCCACAAATGTACT
 40 GATAAATTTCTCCCTCACTAATGTACTCTCTTAAAGGGAGGAAGATGATACTTCAACAATAAACTTCAGACAAAAAAATCTGT
 TAACTAAGTTGTGAGCTACTAGGACAATAAATCTCTATCTTGAAGACATTCCACAATACATGAGAAATTTACTTGTCTAGCAAA
 CTTTCTTTTATGAAAAAGTGTATTAGTCTAATTTCTGGGCAGAGTTTAAATATTAGAAATGCAAACTTTTGAACAT
 CTTAACCTCTTAGAAATATCAATTTTACTCCAGTAAAAATATCTTTTTTTTTTTGAGACGGTCTCACTCTGTCAACCCAGGCTAG
 45 ATTACAGTGGCGCAATAACAACCTCACTGAGCCTGGAACCTTAGGTTCAAGCAATCCTCCACCTCAGCCTCTCGAGTAGCTGGG
 ACTTATAGGTGTGCGTCAACCCCTCAGCGAATTCAGTAAAAATCTTAAAGCTCAGACTCCCTGTAGAACCTCTCTAGATGCA
 TGTACAGTCATATGCTGCATAACATTTGTTTAAAGCAGATGTCACATAGGACAGTGGTCCCGTAGATATTAAATCTAGTATCTT
 TACCTCTCAATGTTTAGATACACAAGTACTTACCATTGTGTTACAGTTGCTTACAATATTAGTACAATAACATGCTATACAGAT
 50 TTATAGCCTAGGAGCAATATGCTATACCCTTAGCCGAGGTTATAGTAGGCTGTCCATCTAGATTGTGTGAAGACATTCTAAGA
 TGTTCCCAAGTGTGAGAAATACCTGATGACATCTCTCAGAATGTATCCCACTCTTAAGTGAAGTACTGATTTGAAAAA
 GTTTAAATTTGAATTTATTTTAAATGTTTTCAATTCAGAATGAATTTCAATTTGCTACAAGTTAATTTATCTAGAGCAATC
 45 TAAAGCTAAGTCTAACAAGAGAAATATCAGCATTTATGAGTGTGGGACATAAACTAAAATGCCATATGCGAGCTTACCAAGCCA
 CTCACACTAGCCCTTGTGAGGAGCTGACTCAAGAGTTAGGCCCTTTCTAGTTTGGCCCAAGTTTCTTAAGCCCTTCTGT
 GTCTGCAAGGGGAACACATCAAGATGGTATTAATACTGGTGTGTTAAAAAGAGTAGTGAGTACTCACTTCGCGAGCACATATACT
 AAAATTTGGAACAATACAGAGAAGATTAGCAATCGAAAAAGAGAGAAAGGGTAGAACGCTTTAGAGCATTAATGTCCAGGGG
 55 ACATTTGCGGCCCTAGTGTCTACACCATTTCTGTTTCTTCAATTTCTCAGGCTGGGCTAGGGGTAATTTCAAT
 AAATTTAACTGCAGGAATTAGATTGAAGCTGGTTTCTGGACTATACTGATATTGAGAGTATATTACCAGGTATAGAAATCAT
 AGAATTTTAGAGCTTCATTGAGATCATGTAGTTCAAAAGTAGAATAAGTTAGATTGAATTTTATTGGAAGGTAAATGTTGTT
 60 TATTGGGCATGGAATGAGTATAACAGACGAGTGAATTTAGTCTCTACAAGTTGTGATCTAAAGTAGATCAGGCTGTTAG
 AAAAGAAGCATTTTAGGAAATCTCTAGATTGAAATATAGGCTATTATGTTACAGAAGTAGGAATAAAGGATTTTCTTCTTTTTTA
 TTTTATTATTATTATTTTATTATTTTGAAGTGGAGTCTCCCTCTGTTGCCAGGCTGGAGGCTGGAGTGCAGTAGCGCAATC
 55 TCAGTTCACTGCAACCTCCGCTCCAGGCTCAAGTATTCTGTGCTCAGCCCAAGTAGTGGGATTACAGGCAGTGCACCA
 CAGGAGTGGAGGCTGAGTGCAGATATCACGCCACTGCATCCAGCCTGGGTGAGACAGAGCAAGCTGCGTCTCAAAAAAGT
 60 CGCTTTGGGAGGCTGAGGCGGTGGATCACTGAGGTGAGGAGTTCAGAGACAGCCTGGGCAACATGGTGAAACCTGTCTCTACT
 AAAAATAACAAAATTAGCTGGGTGTGGTGGCACACCTGTAATCCAGCTACTTCGGAGGCTGAGACAGGAGAAATGTTTGAACC
 CTAATCATCAAGAAAAATAGATATCTGTATGCAATTTTCTATTTTGTCTTAAATATGAGAAAAAGCCTCTTATTTAATATG
 65 AAATTAATCTGGGAAAGAGCTTGGTAAATGGGGTGGAAAGGGGAATTAGGCCTCCCAAAATGACCTCTAATATTTAGGGGAG
 GTTATTAAGTAATTTGATTGTGAAGTTATAGTAGACTATTGATTCTTTCACACTTTACATTTATTATTCTCAGTAAGGATATAG
 CTAAGATAGTTATTGATGTTGTGTCTTTGGATTACCATTTTATTTCAGATATATTGTGAATGAGATTAGGACTCTTAAAGAAG
 AAGGAGCATCTGTATTCAATTTAATCTTTGTATATCATTGGAGAAATAGCCATTTAGTTGGCTTTTGGCCCAAGCTCTGAAGCCA
 70 AGATGCAGTTACAGATGTTATATATTGATATTAAATTTGTGGCATTGATAACTTTATTAATAATTACAGATCTCTGACATTT
 GTATTATAGGTGAGGAACTCTGTGCATAGTAGGCTTAGAATAAACCTGTGTTTCTGGTTTGTGTACCTACTAACTGTCTTATT
 75 GATACAAATATCAGTAATTACAAGTTTAATTTAGAAATATGGTGTCTCTAACTTTAGACTGGGTAGACTAAGCTTACCAAGA
 CACACTGTGTGTCTCTTGATGAATGAGAAAGGGGAAATGGTATTGTCTACATTGTGCAACCTCACTTATCACTTCACTGAAT
 TAGCCAGTCTAAGAGCAGCTCTGTTGACTCTCTGTCTCTGCTTCCCTCAGTCCAGCTGGAGGCGCTGTGGTGGAGGATGTT
 TGACTGCAGAGATGTGGCATTCACTGTGGCGAAGGAGAGACACGACATTCCAATTGGAATTTGACAAGCTCTGGAGAAATGTC
 AGCGGGAAGAACATGTATTTATATCTTGGACCAAGGTAAAGCAGCATACAGTTTGGAAACAGTGAAGTCACTTAAAGGACAGG
 GATATGCTGTCTTTTCACTCAGTGTTTGGCATTTCAGTGAAGTTAATCCAAACAGGAAACAAATTAATCAGGCTGCACTAG

TCATCAGCTAAATTAATGGGCCCTTACAATATCATAGAGGTTTGTGAGCATGTTTACTTGAATTGATATATGTTTCAGAACAGGCTCTTA
CGGCCACTTTTGTCTTTTGTGATGATTTGTTTGGCTGCGAGTATTTGCCAAGACAGGCAGCTATGGACCCCTCTCATATGTGGTTTCT
CTACCCCTCTCCCTTTCTCTAAGTTAGGACAGGACAGGAAAACTGGGGTTGGGAGTCAAGAAGCATTTGGATGATTTA
CTACCACTTGAACCTTGTGCCACTTGTCTTATACAGAGTCCCTGAAAAAAAAGCATTCTTCTCTGGATCTAAAGGCCAACAGAGA
TGACTCATTTTTGTCTAAGTTTTCCTCATAGGAATATCCATTAGCATTTCAAGCTTAGAACCTCAGACATCGACGTCTC
TCTTGTGAAAAACATGTTTGTAGTAGTTTATTTAGATCTAAAAATTATACCTGAATCCAATCTTCTCTGTCTTGAGAACACGCCCTGA
GAGAACCCGGGGTGTGTTGATTTTGTCTGCATGAGAGTGCATCTGCTTATCTAGTGTATCCTCCCTCCGGCTCCATGGATTTTTCAGA
CAGTGGGATCTCTAGTTTACTGAGAACTCTGATGACCTGCATCTGCCAGTAGGTGATGTTAAGCCTTTTGTGGTGTCTATTATAGA
CTCTGTAGTAATCCAATGGGCGAGTTTACCTTTGCCCGACCTTGATCCATAATCATATATATATTTTGTAGATGGAGTCTTGC
CTCGCCACCCAGGCTAGAGTGCAGTGTGCTGTCATGCTGCACCTCTACCTCTGGGTTCAAGCAATTTCTCGCTCAGC
CTCCCGAGTAGCTGGCATTACAGGCACCCGCCACCATGCCTGTCTAAATTTTGTATTCTAGTAGAGACGAGGTTTCCACCTATTGTG
GCCAGGCTGGTCTCAACCGCTGACTCTCAAGTGATCTCTCCCGCTCAGCCTCCCAAGTGTGGGATTACAGGTTGTAGCCACCA
CGCCAGCCCAATTAATCATTTTGTAGGTGATCTAGCCAGTCAACTACCACTTGAAAACTCTTCAAGTGTCTTACCTTGAATCT
TCATAGCCGCTCACTGAGGCACCTTTGTATAATGGCTTCTTTTCTCTACCTGGTCTCTTCTTCCACTAACTAGCCCCACTT
AATGTGTTCTTTTATATTAATTTACTCTATATTTGTAGTTTATCTTAGGTGAACTAATTTCTGTTTCTAGGAGATACCTCT
AAAAATCAGATAGACATAGAAAAAGCTATCTCTCCATCTCCAATAATCTCTAACTTCTTTTCTTTTGTGAACAGGATCTC
ACTCTGTCTGCCCGAGGTAGAGTGCAGTGGCACAGTCAAGCTCACTGTAGCTCAACCTCCAGGGCTCAGGTGATCTCTCCACTTCA
GTCTCTAGAGTAGCTGGGACTACAGGTGTGTGCGCACACACCCGGCTACTTTTGTATTTTTGTGGAGACGGGTTTGGCATGT
TGCCCGAGCTGGTCTCCAATCTGGACTCAAGTAGTCCGCTGTCTCACCCTCCAAAGTGTGGGATGATTACAGGCATGAGC
CATCTGGCGAGCCCATCTCTGATTACTTTAATCAGCATTTCAAAATTACAGTAGTTCTAAACTCAGAGAGGTGGATTATGTGTA
ATGTATATTTTCAAAATTAAGCTCCCTTAGGATAAATCTGTATGTATTATGACAACATAATGTTATAGGAACCAAGTTATATATAC
ATTACATTTTTCAGCTGGCTGCACAGGCAATTGGGGACAGATGTCTCAAGTTTAGTGACAAGAAAAAGATAAAATGTCTTTAA
TTTTTAAAGCAACAGTTTCTTTTCAGATTAACTGTTTGTGTATCTAGTGGTTACACTTGTCTGTGCGCTTGGCCAGG
CACTTAACCTCTCTAAGCTTCAGTTTCCCTCTGTAATGGGGATGACAGTATCCATCTCATAAAGTTATGGAGAGCTAAATAAAA
TCTGTGCATATATAGGCGACATGAGCCCGCAGTGTGTAGCTTTTGTCTATTGTGACGGCTCACCCTCTCTCCATTTTACC
TCGCAACACAGAAAAAGGAATCTGTTTAACTAGATCAATCTTTAGATCTTTTCAGGCATAAAAGTGTCAATAGGTTTTC
ATAAATTTCTAGGTATAAAAGTTTATGAGTTTATGAAATAATTTAGCATATTTAGAAAGGAACATTATTTTGTTCAGGTGTT
GGATGTTTGGAGAAATATGGAAGTGCAATCTCTGTAATATGAGACTGCTGCATATGCTTATGCGTAGTACTACATATATATGTAGA
AAACCCCTAGCTGCTATATGTGTGTGCGTATGATCACTGTGTGTATGAGAAACCCCTACCTATATATGTGTGTGTGTGTG
CATGCTGTGTGTGTATAGAAAAACCCCTACATGCTAAGCATGTTTTCAGTGCAGGCAGTGAATTTACTTGTTTTATCAGCTTCC
CACTTTCTATAAACCACTGCATCTAAGTGTGTCTATAAGTATGGCTGTGTCAGAAAAATCTGCAAAATAGCTCTTAGTGTCACTGT
ATTTCAITCTCCAGAAAATTTCCAAGGCAGACCTTCTCTGTGACTCTGATCTCTGATAGACTCTGGAAGAATGTTTCTTCT
GTCCCTCCCCACCCCCGAGACAGGGTCTCACTTTCACCTAGGCTGGAGTAGGGTGGCATAATCTGTAGCTCGAACTCCTGGG
TCAGGGATCTCTCCCACTCTAAGCTCTCTGGGTAGCTGGGACTACAGGTGTGCTCCATCTGCTGGCTGATTTTTTCTATTGTTA
GAAACAGGGTCTTACTATGTTTGTCCAGGCTGGTCTCAAACTCTGGGCTCAAGCATCTCTCAGCCTCAGCCTCCCAAGTGTGTA
GGATTACAGGTGTGAGCCACACACCTGGCTAGAGTGTCTTATAAAGAAAGTCATAAAACATTTCCAGACCAATCCATTTTTC
TTTCTCTCATTTGGGACAAATATCTTCCCTTGTATGTTTAAATACCTAGAGCTAATAAATCTTTTGTGTTTAGGTCAAGTGTAT
ATAGTGTAACTTTTTTCCGCTCTTCTTCTTATGTTTCTGTACGCATGAACCCCAACAAAAACAGGCTATTGGTCAGGCCAA
GGTGGCTCACACTGTGTAATCCAGCACTTTGGGAGGCGGAGGAGGAGTCACTTGAGCTCAGGAGTTCGGCAGACCTGGCCA
ACATGGTGAACCCCGTCTCTACTAAAAATATAAAATTAGCTGGGCGTGGTGGTGCATGCTGTAATCCCGCTCATCGGAGGC
TGAGGCGGAGGAAATCGCTTGAACCCAGGAGGCGGAGGTGTCAGTGAGCTGAGATCATGCCATGTCAGGATGCTGGGTGACAGAG
TGAACTCTTGTCTCAAAATAAAAAAAGACAGTCAACGAGGCCATAATGTTCTAGTATAGAGGAGTATAGTCCAAAAA
ACCTGATTTTCTGGGACACACAGGGTCTGAATTTAAACCTGGCTCTACCACTGCCTGTGTGACTTCTCAGGAAGCACTCTGTG
TCTTTATCTGCAAAAGGAGGCAATTTGTGTGAAGCTTGTAGTCCAAAGTCTTCTATATGCAATATAAGGCTATATGGTCACTTCA
AGTCATTATTTGTATCTTATCTCTGAGGAAAGTCTTAATTCAGGCGACTTAACGTGAATCTCTCTGTATCAAGTCTAGA
TTATCTTTTGGTTAGGTCTTGGGATTCTCTTGTGGTGTGTTGTTTTCAGTCAGATGAGTTGGGTGCCCTGGTCTCTCTCACC
CAGGCTGACAACTTCTGTGTAAATATGGAAGTCAGGTTAGGTGCTGCCAGAAATATCTTGGCGTGGCTCCACCTCTGCAAGTCA
TGTGCGCCACAGCTATCTTACTGAATCGCTCTTAACTTTAACTGCGGAGAGATTAGAAATAATATTTTCTTAGTCTTTTAA
TCCCATCAATAATAGGACACTTGGTGTCTCTCTGTATACAGCCCACTTTCCCAAGGAGATTTCTCATCTCTCAGCACTGTTG
ACACTTTGGGCTTGTCTAATCTTGTGTCATAGGGGCTGTGACGTGCAATGTAGAAATACGAGCATATCTCGGCTCTCTCCACC
AGATACCAAGTACGACCCCACTGTTGTGACAAACCAATAATTTCTAGACATTTGCCAAGGTTTCTGGAGGGAAGAGGAGTAAA
ATCAACCTGGTTGAGATCTGTGGTCTAGGCAAACTGCAGATCATTTGTTGCAATTTGCAAGTCTTACGACAGGACTCAAAAT
AACATGCTCTCAGAAAAATATGTGCTTAGCAAGGACTCACTACCTACCTGGGTAGTTAAGGAATTTTTTAAATTTTATTAGATGG
CAGAAAAACAGGTAGGTAGTATATACATCTAAGAGCTCAAGTAGAAAAATAGGCATCACTTTAAAAATGGTCACTGGTAATTA
GTCTTTTGGGAAGATACCTTTGGCCCGCTCTCTATCTACCAAGCTCTGATCTCTATCTCTCTTTTGGGCTCAGCTTCCATT
TTCTGTGTAACAGTGGAGGTGAGTGAAGTAAATTTTATCTCTGAAAAATCCAGGCAAGGGTAAAGAAAGTGGTGAAGCAACA
AAATTTAGTGTCTTCCACTCTAGTCCCTTTTGGCCAGAGAAAACTGGAGTATTAGATTAGTGGTGTGATCTTTCAACCTG
TACCTTGAAGCTTGAGTTTACTAGTTTGTGTAATACCTTATATATTAAAGAACACTTGTCTGCAAAATAGGGAACAT
AATATATTTCAAGTGAACACTTGACTAATATGCTGGGCTTGTCTAAACAAACACTGGGAAACAGGTGAACAGACAGAGCTGTG
TACAGCTCCCATTTCTAGTAAATATCTGCTTCCGAATCACTTAATTTGCTGGAGATCTTACATGATCCCAAGAAAAACAAATGT
ATGCTCTCAGTTATTTTTTCAAGTGTGCTGATAAGGTATAGAACTCTCACTGATAGCTATAGCAATAAGCAATATTTT
TCTAGAGGAGGTTGTGAGAACTGTCTAGGGCAGCTATTTTGTAGTATATCATTATGTTTGTGTTTCTCATGTGCTTTTAAAA
AATTAATATGTGTGAAAACTTTCTCTCTGATGTGTGAGCTTCTCCCTCACTTATGTGACTGGAAGTGGTACTACTAGAAAT
GACAGCACTTTAAAGTTAAAGCTTATTAACCACTACCTCCCGTGAAGTACCCTTAACAAATACAGCTGTATCTTCTGGTCAACAT
CTTTTGTGATAAACTTAGGGAAAAATCTCGGCAAGTATATGCGCATTTTATTAAGAAAAAAGAACTAGATATGAAATCA
AGTAGAGAAAAAGACAGTGACATTTAAATCCCATGAATCAAGCTGCCCCAAGGAGTACAGGTTGTGCATTACATGTGAATGTGAA
GGAGAAAAAGAAAACTAAACCTAGCTGTTTCTGAAGAACTGTAGCATGAAGTACTTCACTGTATCTTCTGGTCAACAT
GGTTGTGCTCTCAGGCTCTGACACATGTAGCTTGCAAATGATAGTCTGTGATGCTCAAAATCTAGGAAGGTGCTCGGAA
TACACCAATCTTTTAAAGTTTATTTTACTCTCCATTTAGATATGTTTGTGAGAGGCGAGGGAAGCTAAATTTGGCAATTGA
ACCTAATGCTGAGCTTATATAGAAGTACACTTAAGAGCTTCGAAAAAGGTGAGAAAAATACCAATCTTAAAAATATGGTAGGT
TCTTCTCCATCCACTTCTATTAAGTACGTATCTTCTAGTAGGTGATAGATAGAGGTGTTTATTCATTATCAAGTTTGTCT
TGCTGCTTCAACACTGTCTGTAAGAATAGAACAACTGACATAGCACAGCTGATATACAAAGAGGAGCTCCGTGTTCTTATTT
GTTCTATGTGTGACGTTCTTTTTTTTTTAACTTTTGGGTGAGAACTCAAGACTTGTCCCTTATTTGTTCTTAGCTGTGT
CTTTTGTGATCTTTTTTCTGGGTTGAGGACAGAAAGGTCAGTTTCTGCAAGTGGCTCTTGGGGAGTGGGGTGCAGCTTT
TCAGAGCTGAACGGATTGTACCTTCACAGGAGTCAAGAGAGGCTGCACTGTGGCTCCAAGTTGTTATCCCACTGCAAGTCTC

CGAGGGCCACTAGGCTCTGTGACCAGAGATACAAGAAAGAAAGCAGCTAACCCGAAGCCATTTTTTTTTTATACTTCTCCAAGTAG
AGAAGAGAGAGAATTGTGAGTTGCCCTTGGATTCCAGAAACAGCATGCCTCCTTGAACATATTTCCATCTCAGTTTCACTCTGGAG
GCTCCAGCAGCAGCCGACCTGGACACACACAGCATATACCTGAGCTAGGTATGCTGTGTCTTGGCCACGTCGCCCTGGCATT
5 CCAAAGCCCCACCTTTGTGGAGCTCAAGGACTGCAATTTGTGTCTTTTATTCCTGCACAGTGTACTCCACGTTCTGTACA
TTCAACTTTTTTTTTTTGAGATAGGGTCTCACTCTGTGACCAGGCTGGAATACAGTGAGCGCATCATAGCTCACTCCAGCCT
CAACTTCTGGGCTCAAGCAGTCTCTCACTCAGCCTTCCAAGTAGCTGGGACTACAGGCACACGCTACCACACCCAGCTAATTT
TGTTAATTTTTTTGTAGACATGGGGTCTCACTGTGTGGCCGAGTGTCTCAAACCTCTGGGCTTGAGCCATCTCTGCTTGGC
10 CTCCAAAGTGCTGGGATTGTAGGGGTGAGCCACTGTGCTGACCACATTAAGCACATTAATATAAATGGAACATGACCATTTAT
ATTTGTGTAGATTAGAAAAGAAATCATTGTCTGTGGGCTGTACCTTTGGGCTAAGAAAGTGAGGGGAGGCTGTCTTGGGATT
CACCCTCAGTAGTGACATTCCTAATCATACCTCTTCACTTCACTGTTCCCTCCCAACATGTGTGTATAGCATATGGTGTTTTTTATTGT
TTGTCAATGTAACTCTCTGAAGGCTGCTAGCTCAGCATGTATCCCTCAATGTGTGTATAGCATATGGTGTTTTTTATTGT
TAAAGAGAGAGAAGATAATCTTTAGCATGTGGTTATTAGACCTATGGCTTACTATTTCATTTTGTAAAGCAGCTCTTGGCC
15 CTCTCTCTCGTGGCCAGTGACATTTGCTTATTAGGAGCACTCTCCAGTGGTGTGCCACAGCAAGCTGTGCTCTGTATCAC
TCCAAGAGTATATTCATGCACTGCTGCTTGGTATATTGAAATCACATGAAGGTATATGATGTGTGTGGGCAATGTGATTTAAT
CCTCTGCTTGTAAAGATAGACTAGGCCAGGCTGGGCGCTGTGGCTCAGCCTGTAATCCTAGCACTTTGGGATGCCAGGTAGG
TGGATCACTCAGGTGAGGATTGTAGACAGGCTGGCCAACTGGTGAACCCATCTATGCTAAAAATAGAAAAATAGCTGGA
20 CGTGGTGGCAGGTGCTGTAATCTCAGCTATTCCGGAGGCTGAGACAGGTGAATCGCTTGAACCCAGGAGGTGGGCTGAGCA
GCCGAGATCATGCCACTGCACTCCAGCTGAGAGACAGAGCAAGACTCCGTCTCAGAGGAAAAAATAATATATATATATATA
TATAAAAAATATATATATATATAAAAAATATATATATAAATATATACACACACACATACACACATATCTATATTCAGGCATGG
TGGCTCACACCTATAAATCCAGCACTTTGGGAGGCCAAGGCAAGTACTTTGAGCCGAGGAGTTCAAACCCAGCTTTGGGCAACAT
AGTGAGACCCCCCTCTCTGCAAAAAAATTTAAAAATTTCTGGGTGTGGTAGCACATTCTATATTTCCAGCTACTCAGGAGGCCA
25 AGATAGGAGGATGGCTTGAAGCCAGAGTTTGAAGCAGGCTGAGCAACATAGTGAGACCCCGTCTCTACCAAAAAAATAAAAAA
AAATAGCTGGACATGGTGGCACATGCTGTGGTCCCACTACTCGGAGGCTGAGGAGGAGGATTTGAGCTTTGGGCAACATCG
AGGCTCAGAGTGGCCGGATCGTGGCACTGCCTCAGGCTGGAGCAGAGCAAGATCCTGTCTCAAAAAAAGAAAAATAAAAAG
AGTATCTGTCTCAAAAAAAGAAAAAGACAACAGAGCAAGATCTGTCTTAGAAAAAGAAAAAATAAAAAAATTCATAAAGACT
30 GAAGCCAACCTAAGAAATACAAGAGACTTATTAAGTAGGTGTTCTTTGTTTTGTTTTGGGTGCTAAAACCTGGAATTTGAAC
ATAAGTAGGTTTGTAGTAATTTGAGTACATTTAGGTAAGAGAAATACATGAGTTGGCAGAAAGATGAGTAACCTTTTATTA
TTCATTTTAAAAAGTAGAGGATAGTCACTGGGCGCGGTAGCTCAGCCTGTAATCCAGCTGAGGTGGGTGGATCAGCTGAGGT
GGGAGTTTGAAGACAGCTGACCAATATGGAGAAACCCGCTCTACTAAAAATACAAAAAATAGCCGGGATGGTGGTGCATGC
35 CTGTATCCAGCTACTCCGGAGGCTGAGGCAAGGAACTCTGAAACCCGGAGGAGGAGGTGTGGTGGAGTACACCA
TTGCACTCCAGCTGGACAACAGAGCGAACTCCGTCTCAAAAAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
GGGCTGTGACACAGCAACACACACTCGTTATCTTTGAATAGAGAGAAATTTAGTTACCACTTTAACTTCATAATTTATATGC
AGTAAATAGCACTGACCAACACCCACTGTCTTTCTAAAGGCTCCAGATTGTTCTCTTGACTCTGGTCTCTTAACTCAGCT
40 TGTAATAGGCAAGTGCAAGTTATTTCTGATTGTATCTGTAATGGTGAAGTAATAATACACAATAACAAGCTAGCAGATGATAA
TGAAGTCATTTATTTATGGCTCTAAAGTGATATTTTGTGATGAGTCTTACTCCCAATATGTTTTGTCTGAAGTCCCCCAGAT
ACATCTGCAAGTTGATACAAATTTAGCAGTATTTAGTATATCTGGTTGTTTTAGAGTGGCAAGACAACCTGAGCCAGAAATTTGA
AAATCTGTATGAATATACAACTACAATTTGACTACAGTCACTGTTCCATTTTAGAGTTGAAAAACAGGCTTGAGAGAAACAGCC
45 TAGTGGAGAGGTTTGAGAGGGAGATAAGGCATGGCCTTAACTTTGTGTGGGTTTCACTTGTATTTCTAAAGATTCACTTTGTAGC
AGTGCTTACAGAGTACGTTCTTACTGTGTTTTTGGGCTCCTCTCTTTGAGCAACATTGTTCAAGCTACAGCTGGTCTGAT
GGAAAGTGAGTTCTTCAACAGTATGAAGAAGCACTGGCCTAGCAGTAAATTTGGCACTGACACCAATTTCAACAGCCAGAGTGT
50 TTCAGTTTGGAGTATCTTCTAGAAATAGCTGCTCTTTGTTCCAATAGGCCTCAACTGATGCTTTCTCTCTGTTCTATCAACCAT
GTCACAAAATTTACACAGGCCAAAGAAATCTGGGAGATGGATACCAAGAAAAATTTGGAGCAGGCTGCCATTGCAAGAGAGG
GAACCGTATACTTTCAAGGTGTGTGAGTCCCTATGCAATCTTTTCCATCTCAAGAAATTTATTCAAGTGTGGTGAATTTGTGCTGAT
ATTCCTTACTCTGAATTTGTCAACACTGCTTGGTAAGAATAAGCTGCAATTTTATAAATCTGTCAATTTCAATATGAAAAATGG
45 TGAGAAAACAATCATGTGAAAAAATAAAGTACAGATTCCTCTTTTACACATTCTGCTCTAGATTGTAACCTTCCATACAGGCA
GACCAAGTCTGGCATCCCAACCCACAGTATCACTCACTCTAAAGCATCTGCTTGGTACATAGTTGGCATCAACAGTCTT
TTTGAATGAAAAAGAATGAATAGAATAATTTAGTCAAGAATGGAATTCATAAGGGTAAGTTTCAATCATTTTCTTTCTTCT
CTTTTTTTTTTTTGTATGAGAGACAGGGTCTCCCTTTCTTTCCAGGCTGGTCTCAAACTTCTAGCCTCAAGCAATCCTCCACCC
55 TCAGCTTCCCAAGTGCTGAGATTACAGCGTGAGCCACTGACCGGGCCATCTTCTTTAGACTGTCTTGTAGTGTCTGATGAT
GCATATGATAAAGGAGAGAGGACATGCACAAATTTCAAACAACTGACAGGAGAGTATTGATGCTCTAATGGCCAGATGAT
TCCCTGCACACTGTCTTTATGAGGAATCTCCGGATATTTCTGTAATGATATTCAATATAAATGCTTCTCAGAAACCTTTCTGGAG
CAACTAGGAGTGTGATATTTCTCACTTAGATCTTAACTCTAGATGTAAGAATAAAGAAACCGCCCTTCTTCTGTTTTAATC
60 AGTGTCTTACCAATGCTTCCCAACCCCAATATATGCTTCTCCATGTCAAGCAGAAAGGGCTTAGTGATGAGAATTAGAGGGAG
AATGGGAGTTCTGTCAAGGTTCTTCTGTTTTCTGCCACTGCAATACAGAAATAGATGTTTTTTCAGCAGTATAAAGCAGTGAGGC
ATAAGTGTACTTTAAACAGTCTTTATGGGCATCTGTATAAGACATGCTATTATTAAGTTACAACTTTGTCAGGAGGAGGAGTG
70 GCAATGTTAATCCAAATGAACAACTAGAGAATTATGTAAGAATATATAATCAACCCAAATTAACACAGCCAGAGGACCATGT
GTTTTCAGAAATTTGAGCTGAGACAATATGGGTGATGAATCAGTTTGTGGAAGTGATTGCAATATGTTATAAGGATCAGTTTT
GTTGCAATAAATTTGCTTGTGTATGATGAAGTACTGGATTGCATATTTCTTACTGTGGTGGTATTCAACAAATTTTAAATCAT
GGGTTAGATAAGTATAAATATATAAATATGTTATTTATCATTTACTATGTATATAAATCTTTAGGATCACCAGAAAGCAT
65 GGGGATGATAGAATAAGCTCAGAAATGGGAAAAATGGGCTTTATTGCTCTTCAATGATTTAGTCATTTAAGGTCCAAAGAGGT
TATATTTCAAGTGAAGAAATAGGGGAGTTAGATGTTCCCAAGTTTCTTTCCAGCTGAATTTCTGTGAGTTTCTAACTCTCAAG
AAGTGGGTTATTTGTATATCCAAATACATAATACACTAGAGGAAAAATGTTCTACAAATTTCTTAAGATCGTGAGTCTTAAAC
AGTATTTCTATATTTCCGAAGTCCATAAAATCTTAACTATATTTATATATTTCTCAATACTTCCAAATAGAATATTAAACAG
75 TTTGGGAAGATTGAGGCTTTTGGCCTTTGACTAGAATATATCGATTAGTGTAGTAAACAGCTCAGCTATTAGAGGCTCTAA
TCGGTCTATGATACAGAAATTTGGAGAACATTATTTGTAATGAATAATGTTATGAAGCCATCTGTCATATAGCTGTGTTCTGAA
TATATACAGAGAGATGGCCAGAATTAGTGATCAGTAGCAGAAAGCAATGAGTGTCTGTACAGTTACTTAACTTTGTGCTTATCAG
CATCAAACTGCAAGAGTGATACTATTATGAACCTACTTAAATTTACCAATCTTTGGATAAATCTGGATCAGCAGTCACACAT
GGAAAAAATTTATTTTAACTGGAATTTGATAGGCAAAATTTTCAAACATTAGTCCATTGGGAAAAAATTAATGAAGGTTCAA
AACCCTGACCTGAGACTTTTCTCCAGAATGTCTCTGAACATTTGTACCACTAAAACTTCCCTGGAGGCACCTTTATAATAT
AGGTAAGAAATCCAGCAGTAGTCTAGCGTTAGCTGTAACCTTCAAATGGTTAGTAGATAGTTTCTGTACATATTTCCCTTCC
70 ACAGAGTCCAGATGTGTAGGTGAGAGCAGAGATGGGCTGAACATAAGATCTGTATTTATGCTCATCTGCATATTGGAATTTCTGTT
CCATTGATCTGTTGTTTGGTTTATACCTAAATGGGTAAGGCTCTCTCTGAGTAGGATTGAATTTGACTCAGCTTTTAAAGTGGG
AATGATTTTGCATTGAAGATGTAAGTCTCATTTCAACCTCTGAATACTAAAGAGAGAAAAATAGAGAACTCTATTTGGCTCT

570

TCTATGTGGATAGCTGCCATCTGGCCCGTTTATTTTAAAGTTAACTCTCCACTGATTACATTACCACCTTTGTCACTTTTCAAA
 TGTTTTTATATGCAGACACATGACTGTTTCTGAATGATTGTTCTGTTCCACTGAGCTGTTTGTCCACATGCTAGTAACCAAACTG
 TCTTAATTTAGTAGTTTAAAGTTTGTCTTTTCTCTGGTAAGACAAGTGCTCTTATTTTCTTTTCCCAATTTTCTTA
 GCCATTCTGGGCACTTATTTGTTCCAATGAACCTTAAAAATGAACCTTCAAGAGCCCCCTCTCAAACTCTCTTGGGATCTTTCTA
 5 GAAATGCAITTAATGCAGAAAATAATTTGGGTGAATTTTGGATCAGTAGTATGTAATTATCTTGAGCCCCATTTTAAATA
 CACTTTTCCATCTCCTTTGGCAAGAGAAGCTTTGGTAAGCTGTTTACTGAATTTATTAATAATTCGCTCTTTCTAAATATAGACCA
 TCTATTCTAGGCCCTTGGACTGGACAGTGCCAAATGAGAAAGGCTGTATAGGAGGGGTGAAGCCCACTGCTCATGAACGAGTTT
 GAGTCAGCCAAAGGTGACTTTGAGAAAGTGTGGAAAGTAAACCCCAAGAAATAGGCTGCAAGACTGCAGATCTCCATGTGCCAGAA
 10 AAAGGCCAAGGAGCACAACGAGCGGACCGCAGGATATACGCCAACATGTTCAAGAAAGTTTGAGAGCAGGATGCCAAGGTGTGT
 CAGAGCTGATGACTGCAGGTGGATCAAGAGCCTGACCATGCCCTTTGATTTTAGGGGACAGGAACAGCTAAACAACCCCAAGAGG
 CTCAAGAGCAGGGAACGATTTCATCTAATCTGAGGCTGCTTTGGATCCAAAGGTGAGTAGGGCAGTTCCAGTCAGCTCAACAAAGG
 CACACGTCATGAGAGATGAGAAAATAAATCCCTTCAGATGTATTAGATTGGTTCAAAAGTAATTTGGTTTTTACCATTACTTT
 CAATGGCAAAAACAGCAATTTTGCACCACTCCCCCGCCCGCCCCCGGGGCCCTGCCGAGTCAGAGTCTCACTCTGTCAACCA
 15 GACTGTAATGCAGTGTCTAATCATGGCTCACTGCAGCTTGAATCTCTGATCAAGTGATCTCCCACTCAGCTCTGTCTGAGTA
 GCTAGGACAAGCACACTACCACTGGGCTAATTTTAAATTTTGTAAAGATAGGGTTTCACTTTGTGTCTAGGCTGGTCT
 CGAACCCCTGGCTTCAAGGGTTCTCTGCTTTGGTCTCCAAAGTGCTGGGATTATAGACATGAGCCACCATGCCAGCCCTTTT
 GTCATTTTGAATAATGTAACCCATCAGGATTTTCTTCAAGTAAGACTTACGATTTTCCAGGAAATGGGATGTTATAGGAG
 20 CCAATCATCACACCTGTTATCTTGAGGGTGGGAGGCTGAGGCTGAAAAATGTGGCAGGAGAGGTCTGTCTGCAGAGAGGGCGGCT
 CCTACAGCATAGTTGGCATTCTGGTCTGTCCCACTCTCCAGGAATGCCAGACTTCATTATCCCACTGCTGCCATGTGTCA
 ACCAAGAAAGGTGAAGCTCCCACTTAATCTTGTAGCACAGCCCTGACCTACCACTAGATATCTAGAGAAAATCATTTGCA
 ATACCTCTGTTTGGGACTGATACACAGCTGAGGAGGACAGGAATTTTCACTTCTTTATTTCTTAACCTTCTTGATTGCTTA
 TTTCTTCTTAGGAAGAGGCAATAAAGCAATGGGCAAGAAAGACTTCAGAAGGGGTCAATAAGAAAGGAACAGACAGCTCAAGC
 25 AATGGAAGAGAGAAACCTGAGGGCCAGCTATGACGCCACGCCAAGGAGGGAAGAGTCCAGTGAATCGGCCCTCTCAATGGG
 CTTTCCCCCACTCAGGACAGAACAGTGTGTTAATGTAAGTTTGTATAGTCTATGTGATTCTGGAAGCAATGGCAAAACAGTA
 GCTTCCCAAAACAGCCCCCTGCTGTCTGCCGAGGGTTCACTGAGGGGTGGCAGGGACCACTCCAGGTGGAACAAACAGAAAT
 CTAGTGTGTGTGGAGGAGTGAGCCAGCAGCTTAAGTCCAGCTCACTTCAGTTTCTATCAACCTTCAAGTATCCAATTCAGGGTCC
 30 GTGGAGATCATCTAACAATGTGGGGCTGTAGGTTTACCTTTGAACTTTATAGCACTTCATAGCACTGCAGAACTTTAAATAAATGTCT
 TCATGAATTTCTCTTCTACAGTTGGGTAGGGTAGGGGAAGGAGGATAAGCTTTTGTTTTTTAAATGACTGAAGTGTATAAAT
 GTAGTCTGTGCAATTTTAAACCAACAGAACCCACAGTAGAGGGGTCTCATGTCTCCCACTGCCAGCAGTGTACAGACGTGA
 35 AGCCAGAACCTCAGAGGCCCTGCTCCCTGGGGAGTAATCTGTCTTCTCTAAACACCCCTTCAGCAATGATAATGAGCAGATGAGAGT
 TTCTACCAACACAGCCTGCTCCCTGGGGAGTAATCTGTCTTCTCTAAACACCCCTTCAGCAATGATAATGAGCAGATGAGAGT
 TCTGGATTAGCTTTTCTATTTTCTGATGAAGTTCTGAGATCTGAAATGTGAAAGAGCAATCAGAAATTTGTGCTTTTCTCCCTC
 CTCTATCTCTTTAGGGAATAATATTCAATACACAGTACTCTCTCCAGCAATGCTACTGCTCAGCTTCTCTTCTTCAATCTAATCC
 40 TTGCTATTAGAAATTTAAGACTTGTGCTTACAATTTTGTACCTGGAGTGGATCTATTACATAGTCAATTTAGGATCCATGCAGC
 TTTTGTGCTTTTAAAGATTATTTGGCTCATAGCATATGTATAGTGGTTTATGGAATTTTATTAACCTCTCTATCATGCAAAA
 AAATTTGACTTTTGTACTAAGCTTAATTTTAAAAACAAATCTGTAGGGTTGACAAATAAATAGTTGCTTCTTACACTAGG
 GGTTCACCTGAGGTTTGAACACGAGTGTCTGCTTTTCTGCTTCTGCTCAAGCTTCTGTTCTGCGTGAGTTGTGAAAGAGT
 45 GAAGACAGCTTCCCATGCCGTGACAGCCAGTAGCCTAAATCTCCAGTACTTGAGCTGACCATGAACTAGGGCAAGTCTTAAT
 GTGTACATGTAGTTGAATTTCACTCTTACGGGTAAACAGATTGAGCATGGCTCTCTATTCCTCAGCTAAGAACACTCATGGG
 AATGCTTTGGCAACCCCAAGGAACCATTTGCTTAAACCTGGAACATCTCACCTTTTAAATCTTAAATAAATAGGAGCAAAAG
 50 TTAATTTAGTTTATTTTATGATGGTTTATCAAAAGACTTTTATTTAGATTGGGACCCCTTCAACCTTAAATCAAGTT
 ATTTCTTTTATAATATCTTTCTTCCCATGGAACAAATGGGATCAATTTGTGAGTTTCTTCTTAAATGATACTAAATCCCTC
 TAATTTCTATTATGCTTTTGTCTTTTATGAAATTTCTTTTAAAGCCCCAGTCTCACTACGAAATTAAGTAGGAGCAAAAG
 55 CTGATTTTGTCTTACTTGTCTAACTGTGGGAAAGCTCTGTAGAGCATGGTTCCAGTGAGGCCAAGATTGAAATTTGATACTAAAA
 GGCCACCTAGCTTTTTCAGATAACAAACAGAAAGCTATTCCAAGACTCAGATGATGCCAGCTGTCTCCACGTTGTATTATGG
 ACCACTCAAGAGACACTTTCAGTATTCTGTATCAAAATCAATAATCTTAAACAATTTGTGTAGAAGTCCACAGACATCTTTCAA
 CCACCTTTTAGGCTGATATGGAATGCAAGTCAAGTATGAGGAATTAAGACATTTGTTTTTAAAAAATAATCATTTAGATG
 60 CACTTTTTTGTGTGTTCTTTAAATAAATCCAAAAAATGTGACTTCCCATTTGTTTTTGGTTTTGCTTAAAGTATTGAGGAA
 GCTATATTGTTTAAAAACCATGGTGGGGCCAACTTGAAGAAATAGACATCAGAGAGGTGAGGCTAGTGGCTCATGCTGTAA
 TCCACGACTTTGGGAGGCCAAGGCAGGTGCATCACTGAGGTGAGGAGTTGAGACCAGCCTGGCCAAATGGGTAACCCCTGTC
 TCTACTAAAAATACAAAAATAGCCAGGTGTGGTGGTGCACCTGTAATCCCACTACTCAGGAGGCTGAGGAGGAATCACT
 65 TGAACCTGGGAAGTGGAAAGTTGCACTGAGCCAGATTTGTGCTCACTGCACTTGGCCCTGGGTGACAGTGTGCTCAAAAA
 AAAAAAATAAATAAATCAGAAATCGGCAATGGACAGTATCATCTACATTTGCTCTAAGGTGAACCTGAAACCAACATTGG
 GGTGAAGTGGCAGAACATGCATCTTGTCTAAAAAGAACCAAGTAATGGGAAAAATAAAGGTTTTGTTTTTCAATTAGCCAGC
 70 GGATATTTTCACTTTTAAAGCTGATTTTAAAGTAGGCTCGACTGCAAAATAAATTTAATTGTGCCCTTTAATAAATATAGAAA
 CATAAGTAAGGCTATCTAAGGTGGTGGTCCATATTGAGCATGCAATTTCTTCTTAAGTAGCATATATCATCAATCTCATCATCA
 CAGACTCTCAAGGCCTAAGGAGATGTACATATCTGCAAAATCCTCATTTTCACTGCAAAAGAGGTGGCAGTGTGGAAGG
 75 TACTTAGTAGGCTCTGAGGTCTACAGACAGGTGTATGCAAGTTCTAGGCACCCCTTATTCCTCTGAATTTCTGGCTCATCTC
 TGGATTGAAATATATTTCTCCCTCTCCCTGTTAAATTTTGGTAATGAAATAAATCTTAGCTAGGTGCGGTTGCTTATGCTT
 ATAACCCACGACTTTGGGAGGCCAGGTGGGAGGTTGCTTGAGCCAGGAGTTGAGACCAGCCTGGGCAACATGGCAAGACCC
 TGTCTCTACAAAAAGTACAAAAATAGACAGACATGATGGTATGCACCTTTAGGCCAGTTACAGGCTGAGGTGGGAGGATCACT
 GAGCCCTGGGAGGTTGAGGCTGAGTGCAGTGCATGCTGCACTCCAGCCTGGGTGACAGAGCAAGACCTATCTCAACC
 80 ATAATAAATCCCTTTATTTGCGTGCTTTTCTTTTGAAGAAATAATGATCACCTTAGGGATCTTGAGGATGAGCCAGAGAAGAT
 TCTCTGCTGTAATGTGTGATCTCAGAAATCAGAGGCACTGCAACCTCCTTAAAGTATGTTAGTATGTTAGTGAAGCCTGATTCTCTGGGCTGGAGACTATC
 ATACTTACTTGGCCTTAGCAGCACACTGAACTCCACTTTAGTATGTTAGTATGTTAGTGAAGCCTGATTCTCTGGGCTGGAGACTATC
 TCCAGTATTGGTGACAAACGCAATGAAATTTAGGCCAGTTAGTCAAAATCCTGAAACTCAGAAATCCCCAACCCAGCTGTGTATTT
 TTTCCATCAGCTGGCTACTTTATGATCTGAATGACAGTGTGACGAAAGTACATAAAGGACATTCTGTGAGGCTTGAAGGTT
 85 TTGGTAGACCTTCAGTACTTCCCTCAGATTTTCTTACTACATGTCTGACATGGAGATTCTGTGAGGAGGAGGAGGCACTATCT
 GTAATTGCCAGAAATCTCCAGGTGTGACCTTAATAATACACGGCAAGAAAGAGACAGCGTTAAATCAAACTCTTAAGATTTTGTAC
 AGCATCTTGTGTGGTAAGTGCAGCTATAGTTAGAAAAATTAAGCACAGTTTAAAGGCAGGAGTTCTTGTCTTCTAAGATG
 AGGGAACCTTGGAGAATCAAGAAATGAGGAGGAGCCAGAAATGGTGATGCAGCCTGCCATGGCCGTGAGGCTGAGGCTTCTT
 GCACCATTTTAAATAAGGCTTTTCTAGTATGATGAGTGTGCTCTTGGTGATGGAAGGAGATGTTGGTACTTCTTGAATTC
 CCACATTCGGTGGAACTGAAATGGCAGCAGAGCCATGGGCTCATAGTCTACTTTGGAATAAATCTATGGTGGGAAGCTTGCACAC
 90 GTGTTAAGCAGAGGCATCTTTTAAATAACATTTAGGGGCCAGGATGGTGGCTCACACCTGTAATCCAGCACTTTGAGAGGCT

GAGGCAGGAGGATTGCTTGAGGCCAGGAGTTCAAGACCAGCCTGGGCAACATAGTGAGACCCCATCACTACCACACACACACAC
 AAATTAATTAGTACACATGGTGGTGCATGCCTATAGTCCAGCTACTTGAGAGGCTGAGGTGAGAGGATACTTGAAGCCATGAGT
 CGTAGGCTTCAGTGAGCTATGATCACGCCACTGCATCCAGCTGGGCAACAGAGTGAGACCTTGCTCTAAAATTAGAAAAAAA
 5 ATGTGGCTGCTACATTGTTTCCACCTTCCAAATCTCCACAGGTCATTGGTCTTGCTAACCCAGAACTAAGCAGGGAAGGAAATTC
 TGGGACATGTGTTTCCAACCTTGCTTAGTGACACATTGCAAAATACAACTGTGGCTAAGGCTTTCTTTTGTGTTTGTGTTTGA
 GAGGAGATTGTTCTTGTTGCCAGGCTGGAGTGCAAGTGGCACAATCTCGGCTCACTGCAACCTCTGCCTCCAGTATTCAAGTGA
 TTCTCTGCCTCAGCCTCCTGAGTAGCTGGGATTACAGGGTCCGCCACCAACCCAGCTAAATTTTTGTATTTTGTAGAGATGG
 GGTTTACCATGTTGGCCAGGCTGGTCTCGAGCTCCTGACCTCAGGTGATCAACTTGCCTCAGCCTCCCAAAATGCTGGGATTACA
 10 GCGTGAGCCACCGGCTCCGGTCTGTATCTAAGCCTTCTTGAGGTATTAATATTTCCAGCCTGGGTCTGCTCTGGGATAATGTG
 TTTTCATAAGATAACTCCTTATTGTAGGCATTGTTCTTGGCTTAAAGTTATCTCCTTAAAGCTTCTGACTAGGGAATAGTGGTA
 AGAATAAACAGTTGATGAGTATTTGGGGATGCAATGACTAATTTCTAGTTACTCTAGTTCTAGTGAATGACTTGTAGTTTGTATT
 GTATCTGCTCACAACCGTGTTCACACTAAGGACTCCTGAATTTTTTGTCTTAAAACTTAAACCCGCTGGGTGTCCTGGCTCA
 CACCTGTAATCCAGCACTTTGGGAGGCCGAGGAGGCGGATCACGAGGTCAAGAGATCAAGACCATCTGACTAACATGGTGA
 15 CCCCATCTCTACTGAAATATGAAAAATTCGCCAGGCTTGGTGGTGGGCGCCATAATCCAGCTACTCAGGAGGCTGAGGCAAGA
 GAATGACGCAACCCAGGAGGCGGAGCTTGCACTGAGCTGAGATCGGCCAGTGCACTCCAGCCTGGGCGACAGAGCGAGACTCTG
 TCTCAAAAAATAAAAAATAAAAACTTAAACCCATGTGTATCTTATGCCCCCTGTGGGTACCCAGAGTCTTCTTAACATGACACCAG
 CCTTTACCTGTAGTTTAAACAAATGTGATCCCTTCTCCCACTGAGGATCAGGAACACTGCCTTACTCACCCTCTCAGCAG
 CCAGTCCATCATCCCCAACTAGAACATAGTAGACTCGGTAAGCTGGCTTGTCTCTCTGTAAGGCAGCCTCTTGTCTGTAT
 CCCAGTGGCCCTTCACTCCTGTTACTGAGATGTGGAGGCCAAAGCCCCATGATACTGTGGTGTCTCTGCAGCCTGATTTTGTGT
 20 CTTGAATTTCTTTCAAGTGGTGAACCAAGCAGCACTTGAATTTTGGGAGCCATAACTGTAATAATGGGTCCATGCTTCAAGCT
 ACATTGATCTTATATCTATTTTGTGCAAAATGTATACTCAGAGTTCACCAATACGAAGATCAAAATATAAAATATTTCTCTTAA
 AAGTATTCTAAGACCACCCCGCCAGTCTGGTGCCCTGGTCAGCCAGCCCCCAACATTACGGCCCATCTGTGTGAAGTGGGTA
 CTGTTCCACTGAGGTGAAGGATGGGCCCCCTGGGCTGAGCGACTCGCAGACAAGTGAATAATGAGGCTGAGGCTGAGCTCA
 TCACAGCACTCTGCCATCTGCTACTGACATCTCAAAATAGGGAACAGCAGGAACTCAAGCCTGCCTCTCAGCTCTCCCCACT
 25 CATTGAGGCCACACTGGAGACCGAGTCAAGCCAGGCGCCACCCCACTGCTGACATCCAGCCAGTGCTACTGGGCAAGCCCTTCC
 TCAGCACTGCCCCAGCTGGCCACTGTTCCACCCCTGTGCTTCTCTCAAGCATCCGGGCTGCAAAAAGTGCCACCCCTACCTCTG
 AGCTATACCAAGCCCTCTTGGCCCTGGGCGCAGCAGGATGGTTTCTCTGGTGGCAGGATGTTAATCTCTTGGTGCACAGGCGAGA
 AGTCTAGGAGCAGAGAGCTATGTCCTTAGGTCTGTTTTTCACTTACCTGCTACTGGAATACAGCTGCAAGAAAACTGTGTCTTT
 ATTTACGAGCAACTGTACAGATACACCATGCCCTAATCTTGTCTACTGCATGGTCACTAGGATGTACTGAGTTTCAAGGAAATATG
 30 TTTTGTCTACATTTTAAATAGCACTACCCCTTAGGTGAAATTTGGGCGAGTGCACTGGCTCACACCTCGTAGCACTT
 GGGAGGCCAAGGCAGGAGTCACTTGAAGCCAGGAGTTTGAAGCCAGCTTAGGAAACAAAGCAAGACCTGTCTCTACGAAAAA
 TTTTAAATCAGCCGGGCGTGATGGCGCATGCCGTGATGCTCTGCTACTCAGATGGATGAGGTGGGACGACTGCTGTAGCTCAGGA
 GGTGCAAGCTGCGAGTGAAGTGTGATCATGCCACTGCACTCCAGCTGGGTGACAGAGTGAGACCTGTCTGTCATGAGCACTT
 ATAGGCTGGGCTCGGTGGCTCTCAGCTGAATCCCAACACTTTGGGAGGCCGATGGGCGGATCATGAGGTGAGGAGATTGAGAC
 35 CATCTGGCTAACACGGTGAAACCCCGTCTCTACTAAAAATACAAAAATAGCCGGGCGTGGTGGTGGCTGCCGTGATGCCAGA
 CACTCGGAGGCTGAGGCAGGAGATGGCACTGAACCTGGGAGGCGAACTTGCAGTGAGCTGAGATTGTGCTGAGCACTTCCAGC
 TGGGCGATAGAGTGAGACTCCGTCTCAAAAAATAATAAATACTAAGTAAATAAACTTCTGACTGTTCTGGGAACCTCACCCCTT
 TGTCAACACACACTTCCCTGCGAGAGAACTACACTGCTTGAAGTGGTAAATGCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCT
 40 GCAAGGGCAGCAAGGCTTTCTATATGGGCTTCTAAGCTTTCTCTGAACCCAGCTGTCTGTTGACAGGAGCAGATTGTAATAAG
 ACAATACAGTGAGGTTTGACCCCTTCTACCTTACCGCTTACCAATGTGACAGTAGGTAAGTAAACCAAGCCACTTCAAGGCTG
 CAAGTCCGGGCTCAGAACCAAGTTATAACCTGAGATAACCCAGTGGCTGGATGATTGCCAGACCCAGACTTCTTACAGAGAGT
 GCTGCCACTTCTGCGGTGATAACTGCAAAACAGGCCCCCTCATAATGCTCTCATCAGGACCTCTCAATCTGAGGAACACAGAGG
 CCTCAATGTTTGGCAAGAGCACTGGTTGGGTCCAGCTCTGTTGGGATCTCTTGTCTCTCACTCTGAAATAACACTGGCTA
 45 ATATTTATCAACTGTTTAAATATAGTAGAAAAACATACCATGAAATTTATCATCTTAACAATTTTTCAGGTTTTTTTTTCTT
 TTTGAGACAGAGTCTCTCGTTCTGTTGCCAGGCTGGAGTGCACTGGCACAATCTTGGCTCACTGCAACCTCCACCTCCCGGTT
 CAAGTAATTTCTGTTCTCAGCCTCCCAAGTAACCTGGGCAATGCGCCATCATGCCCGGCTTTTTGTATTTTGTAGAGAGGGGT
 TTCACCATGTTGGCCAGGCTAGTGTTAAATACAGTAAGAAGTTCTCTTCAAAGGTTTAGCTTGTAAAGTTTCTTGTCTCTGT
 TCCCTCTTCTCAAGGCCAGACTTCTTACTCTGTGTCTCTCTGCTGGTAAACCAACCTTCCACCCAGTCTTATCTATACAGC
 50 CCACATTTCCATCTGCTACCCACTGTGAAATACCCCTCCCGTCAACAAGACCTTCCCGCAGAACTTCTTCCCTCCACCCCT
 ACCAGTGTAAACCGCATTTCTGCACTTTTCAAGTTAGCCAAACCGGTTTCACTTGGATTGGTCCAGCTCCAGCCAATGGAGACAGGA
 CACAGTAGCGGCGACAAGCTGTGTTAGGAATAAAAAACCCCTTCCCTCTTGTGTTGGGCTGCTCTGTTGGCGACCACTACAG
 AAGCACCCCTTCTGCAAGCAAAATTTGCTTCTGCTGAGAGATCCTTGTCTCAGTGCTGGTTCTTCTTGGCAGCTGAGCATTTGT
 55 TTTCAACAAATTTGGTGGCCATATGGGACCTCATTCTCTCCGGGAAAGGCTCTGATCACTTCTCATGAGGAGACGCATCCC
 GCTAATCTATTGCACTGGCTCAAGGTAAGAAATCGGACCCACCCAGTGAACCAATAAACCCAGACTCTTAGCAACACAGGAA
 GAAAAGGCTACAGTTACTGTGGTGAGCAGGTAAACGCTATGCACAGACCAAGGTAAGAAAACTGTGGGCGGTTGAAGTAACTTCC
 TGGTGGTAGGACAGTTTGGAGGTTAAAGTGTGTAATAAGATGCACAATTAAGTGCAAAAGCAGTGTGGAGTAAAGTAAAGGA
 60 GTGCAAGAAATCTCAGTGGGGAGCTGAGCCTCCAGGGAAGGAGCAAAAAAACAATCTCTAGTAAAGAGGTTGAGCCAG
 GAGGCGGAGGCGGTTGAATCACGAGGTGAGGAGATCGAGACCGTCTGGCTAACACAGCGAAACCCATCTCTACTAAAAATACAA
 AAAAAAATAAATAAGCCGGCTGATGGCGGCGCCTGTAGTCCAGCTACTCGGAGGCTGACGCCAGGAAATGGCGTGAAC
 CTGGGAGGTGGAGCTTGCACTGAGCCAGATCGTGCCACTGCACTCCAGCCTGGGTGACAAAGCAGACTCTGTGTCAAAAAA
 65 AAAAAAAGAGGTTGAGCCCCACACACTCAGGTTGAGCCTTCAAGGAAAGGTTGCAAGAAATCTCTAATAGGAGAGACTGA
 AAATATTGTTGTTTTTTGAACCAAGAACTATTCTTAAACCTTTAGTTTCTGGCCAGTTTGGGTCAAATAGGATTAGAT
 TTGTCACTTTTAAATAAGTATGTAATAACAAAGTCTGTCTCCAGGAAGAAATAGACTATGCCCTGCACTGGCGGCGAGGGC
 CTGCTCTTACCCCTAAAACTGCGAGAAAAAAGCCAGAAATACCTTCCCTTAAAGAAAGTAAATCCCTTAAACCCAAAGCTC
 CACTAGCAGATGGGATTCAAAATTTCCCTTTCCCTCTCTCTCAAAAAAGTCTACCCCAACCTTTTCCCTTAAAGGAAGTGCT
 70 CTAGAGGAGGGAATTTGCTTGTAAATGCCCTTAACTAGTTGAGAGGTGAGAACTTAAAGGAAGAACTTAAACCACTATTA
 GATGATCTTTTAGGTTTGGATCAAAATTAACCGATTTTAGGACCAAGTATACACTTGGGCTGAGCTAATGTCTTCAATTAAG
 TATTCTCTTTTGGGAGAGGAAAGAACCATGATCCGAGGCTGCTATGATAGTCTGAGAGCGCAACACCTTCCAGTCAAAATA
 TCCCTGCGCAGCAACAAATCGCCGCCCAAAACCCCAATGGGATAATAACAAATGCAGCCCAAGAAACATGAAGGCGCTT
 75 AGGAAATGATAGTTAAAGGATTGGGAATCAGTGCTCAAAACCAAAATATTTCCGAGCATTTAATATGCAGCAAGGAAAAA
 CAAAGGGCCCAAGGATTTTAAACAGACTCAAGGAACAGGTAAGAAAAATACAGGCTTAAACATAAGGATCCCTTGGACAGG
 GGATGTTAAAGCTCCATTTTGTACTAGTAGCCAAATATCAAAAGAAATACAAAAACAGAGAACTGGAAGATCAGCCTATAGA
 GGAATGGAGGAGTCAAGGAGAGAGAAAGAGAGGCAAGAGAGAAATGGAGAGGCAAGGAGAGACAGA

HUMAN SEQUENCE - mRNA

GGGCCGCGCTCGCGGGCGCTGCCAGTCTCGGGCGGCGGTGTCGGCGCGCGGGCGGCTGCTGGCGGGCTGAAGGGTTAGCGGAGC
 ACGGGCAAGGCGGAGAGTGACGGAGTGGCGAGCCCCGCGGCGACAGGTTCTCTACTTAAAGACAATGACTACTGATGAAGGTG
 CCAAGAACAATGAAGAAAGCCCCACAGCCACTGTTGCTGAGCAGGGAGAGGATATTACCTCCAAAAAGACAGGGGAGTATTAAAG
 5 ATTGTCAAAAGAGTGGGGAATGGTGAGGAAACGCCGATGATTGGAGACAAAGTTTATGTCCATTACAAAGGAAAATTGTCAAATGG
 AAAGAAGTTTGATTCCAGTCATGATAGAAATGAACCAATTTGTCTTTAGTCTTGGCAAAGGCCAAGTCATCAAGGCATGGGACATTG
 GGGTGGCTACCATGAAGAAAGGAGAGATATGCCATTTACTGTGCAAAACAGAATATGCATATGGCTCGGCTGGCAGTCTCCCTAAA
 ATTCCTCGAATGCAACTCTCTTTTGGAGATTGAGCTCCTTGATTTCAAAGGAGAGGATTTATTTGAAGATGGAGGCATTATCCG
 10 GAGAACCAACCGAAAGGAGAGGGATATTCAAATCCAAACGAAGGAGCAACAGTAGAAATCCACCTGGAAGGCCGCTGTGGTGGAA
 GGATGTTTGACTGCAGAGATGTGGCATTCACTGTGGGCGAAGGAGAAGACCACGACATTCCAATTGGAATTGACAAAGCTCTGGAG
 AAAATGCAGCGGGGAAGAACAAATGTATTTTATATCTTGGACCAAGATATGGTTTGGAGAGGCAGGGGAAGCCTAAATTTGGCATTGA
 ACCTAATGCTGAGCTTATATATGAAGTTACACTTAAGAGCTTCGAAAAGGCCAAAGAATCTGGGAGATGGATACCAAGAAAAAT
 TGGAGCAGCTGCCATTGTCAAAGAGAAGGGAACCGTATCTTCAAGGGAGGCCAAATACATGCAGGCGGTGATTCAATATGGGAAG
 15 ATAGTGTCTGGTTAGAGATGGAATATGGTTTATCAGAAAAGGAATCGAAAGCTTCTGAATCATTTCTCTTGGCTTCTCTGAA
 CCTGGCCATGTGTACCTGAAGCTTAGAGAATACACCAAGCTGTGTAATGCTGTGACAAGGCCCTTGGACTGGACAGTGCCAAATG
 AGAAAGGCTTGTATAGGAGGGGTGAAGCCAGCTGCTCATGAACGAGTTTGAGTCAGCCAAAGGCTGACTTTGAGAAAAGTGTGGAA
 GTAAACCCCAAGATAAGGCTGCAAGACTGCAGATCTCCATGTGCCAGAAAAGGCCAAGGAGCACACGAGCGGGACCGCAGGAT
 ATACGCCAACATGTTCAAGAAGTTTGAGAGCAGGATGCCAAGGAAGAGGCCAATAAAGCAATGGGCAAGAAGACTTCAGAAGGGG
 TCACTAATGAAAAGGAACAGACAGTCAAGCAATGGAAGAAGAGAAACCTGAGGGCCACGTATGACGCCACGCCAAGGAGGGAAGA
 20 GTCCAGTGAACCTCGGCCCTCTCAATGGGCTTTCCCCAACTCAGGACAGAACAGTGTAAATGTAAGTTTGTATAGTCTAT
 GTGATTCGGAAGCAATGGCAAAACAGTAGCTTCCAAAAACAGCCCCCTGCTGCTG

HUMAN SEQUENCE - CODING

ATGACTACTGATGAAGGTGCCAAGAACAAATGAAGAAAGCCCCACAGCCACTGTTGCTGAGCAGGGAGAGGATATTACCTCCAAAA
 25 AGACAGGGGAGTATTAAGATTGTCAAAGAGTGGGGAATGGTGAGGAAACGCCGATGATTGGAGACAAAGTTTATGTCCATTACA
 AAGGAAAATTGTCAAATGGAAAGAAAGTTTGATTCCAGTCATGATAGAAATGAACCAATTTGTCTTTAGTCTTGGCAAAGGCCAAGTC
 ATCAAGGCATGGGACATTGGGGTGGCTACCATGAAGAAAGGAGAGATATGCCATTTACTGTGCAAAACAGAATATGCATATGGCTC
 30 GGCTGGCAGTCTCCCTAAAATTCCTCGAATGCAACTCTCTTTTGGAGATTGAGCTCCTTGATTTCAAAGGAGAGGATTTATTTG
 AAGATGGAGGCATTATCCGGAGAACCAACGAAAGGAGAGGGATATTCAAATCCAAACGAAGGAGCAACAGTAGAAATCCACCTG
 GAAGGCCGCTGTGGTGGAAAGGATGTTGACTGCAGAGATGTGGCATTCACTGTGGGCGAAGGAGAAGACCAGCATTCCAATTGG
 AATTGACAAAGCTCTGGAGAAAATGCAGCGGAAGAACAATGTATTTTATATCTTGGACCAAGATATGGTTTGGAGAGGCAGGGA
 AGCCTAAATTTGGCATTGAACCTAATGCTGAGCTTATATGAAGTTACACTTAAGAGCTTCGAAAAGGCCAAAGAATCTGGGAG
 35 ATGGATACCAAGAAAAATTGGAGCAGGCTGCCATTGTCAAAGAGAAGGGAACCGTATCTTCAAGGGAGGCAAAATACATGCAAGG
 GGTGATTCAATATGGGAAGATAGTGTCTGGTTAGAGATGGAATATGGTTTATCAGAAAAGGAATCGAAAGCTTCTGAATCATTTT
 TCCTTGCTGCCTTTCTGAACCTGGCCATGTGTACCTGAAGCTTAGAGAATACACCAAGCTGTGTAATGCTGTGACAAGGCCCTT
 GGACTGGACAGTGCCAAATGAGAAAGGCTTGTATAGGAGGGGTGAAGCCAGCTGCTCATGAACGAGTTTGAGTCAGCCAAGGTGA
 CTTTGAGAAAGTGTGGAAGTAAACCCCAAGATAAGGCTGCAAGACTGCAGATCTCCATGTGCCAGAAAAGGCCAAGGAGCACA
 40 ACGAGCGGGACCGCAGGATATACGCCAACATGTTCAAGAAGTTTGAGAGCAGGATGCCAAGGAAGAGGCCAATAAAGCAATGGG
 AAGAAGACTTCAGAAGGGGTCACTAATGAAAAGGAACAGACAGTCAAGCAATGGAAGAAGAGAAACCTGAGGGCCACGTATGA

MOUSE NOMENCLATURE
ICSGNM Rel
Celera mCG8770

HUMAN NOMENCLATURE	
HGNC	REL
Celera	hCG15154

[illegible]

AATTACAATTATGAAGTAGTAATGAAAAATAATTTATAGTTGGGGTACCACAACCTGAGAACTGTATTAAAGTGTACAGCATT
 GGAAGGTTGAGAACCAGTCTTTAATAAAGTCTTTTAGAAAACAGTGTAGTCAATGCTCTTTAGCAAAGGCAACGCTTACATT
 CTTCTTGGTACAGCAGAGGTATCCTGTTCTAGCACCATTGACACCTAAAGCTCCACCTGGTACCATTCACTTCTCTTACTACC
 TAGTCTGACTTTTACCCTGCAGATGAATGGCCTGGGAACCACTGCCATGCCAGAGACTGAAGTGTCTAGTGTAGTGTGTT
 5 GTTTGCTCCTTCTGCATTTTCTAGTCTTACTCTGTAGCCACATTGGCCTGAACTTGTAAACATCTGTTCAGTCTCTTAAGTGC
 TAGGATTATAGCTATGAGCCAATAAGCTTCTCTCATTTCCTTTAGCAATTTCTGTTTCCCAATCTCTTTGGAGGCTAAGGCAG
 TATATGCTGTCTGGTGTGCAGTAATAGTAAGGCAGACTGTGCCTGGCGCACATTCATCTTCACTTGTCTCTCTTTCCCTCCCT
 TGGTAAGGCAGCCTTAAAGGTGTAGACATTTGTTATAGGCACGTGTGGCAGAAACATGGACAGACATATTTGTCTTTCTATAATC
 10 TCAGAAATGACTAGTAAAAATAATCCACAACCTACATCAGTTTTGTTGGCTAGAGTTTCCCAATCTCCAGCAGACAGTTGGGA
 ATCAGTTCTTTTAACTGTAATTATTAGCATTAACTCTCAGACCCACAGTATATACATGTTGTGTATATATGCACATATGTAACA
 GGATAAATGATGTCTAAGAGAGGCTACAGAATTCGAGGCTTTCTCTGAAGTCAAAGAAAGAAAGCAGATACAAGCAACAGGAAGAG
 TCTGCATGCATTGGACTAGAAGTCTTACAACTGCAGGCATGGACCGGTTACATCAAATACAGTCCAAAGTGACAGGACATTTCC
 AGGGTCAGTTTGTATGTAGCCAAAGTGTCACTGCCGGAGTCTCTTGTCTTAGCTGGAGACTGAGGCAAGGGCAAAAGGAGTGCTT
 15 TCTTTTCTAGTCCAGGTGAGGGATGGATTACATGTAACATGTCACTTGTGTGTGTCTGATTACCATTTGATATATT
 TAGCTCTTGGTTTATGTTTCACTGTGTGCGAGATAATGATTGTTGCTTGTGCAAGCAAGATATAGACTCATTCTTCTTGGC
 ACTCACTCAAACAGAGTAACCTGTGTCTGGTGTGTTGTTGCTTTGTAATAAGAAATAACTCAAGGCAAGTCAAAATTAAGTGTCTT
 GAACACTCCCATGGGCTCATATAGTTAACTTGGTCTAAAGTAGTGGAACTATTGGGAAGGATTAGGAGGTGTCTCACTGTGGG
 TAGGCTCTGATGTTTCAAAGCCATTCCCTGTGAGCTTTCTGACTTGTGGTGTGTCTCAAGATGTAAGCTCCAGCTAGTGTCT
 20 CAGTCTCTGGCTTCTCATGCTCCCAAGATGGCCATGAACCTTCAAGAACCATGAGCCCTCAAATTAAGTGTCTT
 TACAAATTTGCTTGGTCTTCTTCTTTTATGACTGTAATAGAAAAGTTACTGAGGTCACTAGGCATAGCCTAAAAGGTGATATT
 CCACATCATAGACCTGGTCAAGCAGTCCAGGCCATTCTCTCAGCATTAGTATGCAGTATGCAAGGTGCTGTGATCACCCTGAA
 AGGGAGCCAGAGGTGTTACTGATAGCCCGGCACACTAAGTCCACACCTGCATCAGCTAATCTCCATTCTGTTTCTTTT
 25 ACATCTTCTAAAAGTTTATACCTACCAATCCATCTTCTCTCAACCTGCTTCAATTTGGCTTTTATAATGATCCTTTTAA
 GGCACACTTCTCAAGTCAAAATGTCTCTCATTCTTATCTATTTCTAGACAGGGTCTCCCAAAATAGCCTAGGCTATTCTTGAA
 CTTTCAAGATGTCTGGCATGAGCTGCTAGTCTGGGATTACTGGAAAGAGCTATGCCACCCAAATTAATGACCTCCATTGCGCA
 TACTCAATTAGAGTTCACTCAGAAAAGAACTCAACTGTTTCACTTCTAGCAGTGGCCCTGCCATCAACACTGCTGACCAT
 30 GTCTTCTGTACAAACACTTGTCTAAATCACCTTTCTAAAATTTCCATCATGGCAACAGTGCCCCACCTCACCCTTAGGTAGCATA
 TACTAACAGTGTACCATACCAGCCAGGGTAACTCTCAAATGACTGCATCAACTGCATGACTAAAGTTTCCAGTAGCAACCCTG
 ACTCAGCTCAAACATGGCCTCTACAGAATGTCTTCTAGAGAGCCCACTGTTGTTTCTACTACCCCACTACTTATTTCTTTATA
 GAAATGCAGTGACATCAAGACTTATGCATGCTGTGTTTGGAGACAGCTCCCTCATAGCTCAGGCTGGCTTTATAAATCATTAT
 35 ATAGTGGAGGATGACCTAGAACCCTGTCTGTCTACCTCCACCTCCCAATGCTGGGATTACAGACATGCCACCCAGTACTAAAA
 TTACACAGTGTGATGCTCTGTAAACCCCAATGACAGCAGCTTATCAGGTGTACAGTGACACCTTCCCTAGCACAGGCTTAAA
 AATATCCATGAGAATTTCAACCTCCTATTTACTTTTCTTTGAATAAAGACAGTAAGTAGAACTATGTCAATCAGATATGGTTGA
 GTTAAAGCTGAAGTATGCTGCACTCATGTGTGTGTGTATTGGTGTGTTCAGTGTGTTGTGGCTCATCCTATCTTCAAAGTTA
 40 TGATTCTGTGCTTGAACCTCTGGAGCGCTGAACATAGTTCACCTGTAAATGTTTATTTTATTTTATTTTATTTGATGTTG
 TATGATTGTGTTTAACTAAAAACACAACCTGCTATTTTACTCTTTGAGAAGACAATTTGGAAGTGTGATTCTGCTTCCATGATCAA
 CACTTTGGGGAGTTGTATAACAGGATGAATTTTATGACAGGATAGTATATTTTAAATATCCAAACCCCCCCCCACACAC
 45 ACACACACTTTGGCGTTCTTTGAAGCGCATGTAGAGCTAAGAGGACAACCTTTGGAAGTTGATTCTGCTTCCATGATCAA
 CTAATTTGTGAGGCTTGGTAGCAAGCGCAATTTCTTAAGCTATCTTGTGGCCATGCAAGATGATATTCTCTATTTCCCTC
 CATTACTTGTTTTAGTCAGTAAATGACTGGAGAACGTAAAGAGGTGGAGCCAGATAACCTTGAGTTATTTCTGTTGTTGAGACAGT
 CACCTACCTCAGCCTCCCGCTGCTGGGAGTGCAGTGCCTAAACGGGGCTGGATAATCTTAAGCTTAAATCGTGCAATTCCTTT
 50 TAGAATCTAAAAGTATGGACAAGCTACTCAGCTTCTCAAACCCCAATCAACCTTAATCTGCTGTATACAAATGACATGTAAATC
 ATCATAGACTAAGAGAACAGGTGCGTATTAGCAACTGAAGGCAACCAAGATTCCGCTGACCTGTCAAAGCACCAAGGTTCGGTCC
 AGGCCCTCAGGCGTGGGTATCTCGGCCAATCTCTGGACGTCGTGTACATTTATACAGAATGGGGTTAGCGGCTCCGAGTGCAGT
 55 GAAATCTTTGATAGTAAAAGACGTAAATGTAGATATAGAGGGAATAAGGCTGCGGGGTCCCGTATGCAAACTGCGCCCTTA
 CTGCCGAACCGGGGCTGGCGCTTCCGCACTTCCCTCAGAGCACCAGGACAACCTCTGCGCGGGGGGGGAGATTGTCATGT
 GCGAATCGGGAGAGGGGGAACCCCGGTGAAACCCCGGGGGGCTCGGGCGGCAAGGAGCGCGCGGTGACCGCGCGG
 60 CCGCTCTCGGCGCTCGGCCAGCATGCTCAGCAACACGCCCTCGGCTTTAAGCGGCGCTCTCAAGACTCTGAGGAGGGGG
 ATTTCTCAGGACCGGCGCTTCTCAGCGCGGAGTGTGCTGCGCGCCCTCAGGAGCTCCCGCGGAGCGTGCAGGCTGTGG
 TGGCTCTGGAGGAAGTAAGCGCACTGGCCGCGCGGGGTGCGCGCGCCCGCGAGGCTCCGCCCCCGGGGTAGGCGGTGG
 65 CGCAGTGACGTAAGCAGCGGGAATCCCCCCCCCTCCCCCAGCTTCCGCGGGCGGTCCGCCCCCGGGGTGAGCGCGG
 CATCTGGCAAGGCGAGCGCCAGGACACTAGTGACCGGAGCGGAAGATTGGGGGTGGGAAGGTGTGAGCGCAACCCAGAGGAG
 CCGGGAAGAGAGGAGGCGCGGGGTGGTCCGAGGACAGGCGTCCCGCTGCGGAGGCTGCTCAGCTCTCTAGTGTGGTGA
 70 CTGACGGCTAGCTGGCTGACTGCTGCTGACCGACTGCTGCTGACTGACTGACTGACTGACTGCTGCTGCTGCTGCTGCTG
 TAAATTTGTAATTTAACTCATGTTCTGATTAGAAGCACAAAGGCTTTAAGTATTAAATCATTGGTAAATCAGAAAGAGATT
 TGTATGACATTTGTAAGAGTGGCAAGCTTGTGTAAGACAGTTCTGTCTGTCTACCTAATAGAATCTTATTATATAGTGTATGA
 75 ATGCAATCTGAAATTTTTTCAACAGAAAAGTCAATTTAAAGAACTGTAAGACAGATATGATTTAAATGTAATCAATGCA
 AATTTGCTGCTAAGACATATATTTGTGCTGTATAGAAATGATTTCAAAGTTAAAGTGGGGAACCTTTAAAGAAATGCAAGT
 TTTAAGGATTTAGAAGTGGGTGGGCTGCGCAGCTTCTGTGAAGCCCTGGGTTCACTTCTCAGTACTGTGAGAAAAA
 AATCCCAACAAACATAGAAAACAAATCTGCAAGTTGTAGTATCATTATCTTGTCTTTTATCAAGGGTTGCACTAA
 ATGAGACTACTTAAATACACCATGTCTTAAATGTAATCTGCTATTGAAAGTTCTAGGCAAAATATAGTTTAAAGGACTC

576

577

ACGTAAGACTTTTATACATGTTAGGCTAGAAATCTGCCAACATATCCACCACCTCTTTATTTTTTAACTTTTGACTGTTTTGAGACAG
AATCTCACTGTGTAGTCTCAGCTTAGCTTTCCAAAGCTGTAGTGATCTCTCTTCCAGCTCTCCAGAGACACCGGGGTTTATAGTAAGCA
TGCAATACCATGTCTCGATAGGTTATACCTCTTTTATTTGTGAAAGTAAAGAAACATATGTTGTGATTAATCTCTTGCTGTAT
GTTCTACAAAAAATTTGTGACTATCCTGTAATACACAGACATAATCTCCAAAAAGTCTCTTTATTAATAGTAATGACACAAAAACA
5 CAAAAAGCCCTAGAAAGTACACACTTGACAAGAAATCTTAAGCCGCTGCATGTCTTGATCTCCAGCAGTGTGTTCAAACCTTTTCAGTCA
GCTCATTTGTGTCTTGAATACCTCTTTCTTGATTTCTGTGAAGACAAACTTGTGTGAACCTGTAGTTTCTGGCTGTGTTGTCATGGC
CTCTGGGTTTTATCTTTTGTGCCACTCTAGTGATATATATATATATATTAGTTGTTGGGGTTTTTGTGTTGTTGTTGTTGTTGTTGTTGAA
ACAGGGGTTTCTCTGTATAGCCCTAGATGTCCTGGAACTTACTCTTTAGACCAAGTTTGGTCTTGAACCTCAGAGATCTACCTGCCTT
10 TGCTCCCAAGTACTAGGCTCAAAGGTCATGCGCTCCACTGTCCAGCTTAGTGCTCTGATCTTATACTGCGATCAGGAGAGTGT
CTCTCAGTCTCTGTTCCAGGTGTTCTTTCAGAGAGTGTGATTTCCTAGTTTCAAGACTGAGCTAGCAGGGGTTGTTGTTGTT
TGTTGTTTTTAAATTTCTAGTAGTATACATAGGCCCTTGAAGCCCTTTGGACTCTTATGTGCTTACTCAGTGGCAGGAAAAACATCCAC
AAAAGATATGTAGTGAATGAACATGCATGTGTTCCCAATACAAACTTTATTTGCAAAATGAGCAGTATGCTGAATTTGGCCCATGA
TTTAGAGTTTGGCAACGCTCACTCCAGACACTAAGTTCCATGAAGAGAGGAAATGTATCTCCATCCCTTTGGGAGTTTAACTG
CACAATTGGAACTCCAGAACGTTGTAATGACTATGAAAAGTACATTGAGTGAATGATCAGACGCCCATGATTTCTAGCTTCC
15 TAAGTCAGTGTGTTCCGCTCTTCCCTCTTTCTCTCTTTCTTTAGTACTGGGCTGATTTCCAGGGTATGATGTGTAGACAGGATACCAC
ACTCTGAGCTAACCTCTGTGCATACCCGATGAGGTTATCAGATGAAAGAAACCAAGCTGTGTATGTTAGGTTGAAGAAATAT
TTTGTGTCAGGATTTCAAGAAAGGATTAAGAATTGACAAATTTATTTTTTGTATTGAGGAGGAGGAGGAGGAAGGAGTGGCAAAGTT
ATTTTAGGTGCTAATGAAGTCACAGGTTGTGAGTGCCAAGCATGAAGATGAACATACAGTAATAGGAACATGGATGAAGCAAAAC
20 AGGCAGCCTCTGGCTGCAAGTGCCCAAGTGAAGTTGAAGAAACAGTATGTTCTTACTATTTGAGTTTGTCTCTTATTCACACC
CACCCTCTCAGATGATGTCTAGTGTTTTTCCATGTGGGAAACAGTATGACTGGATGGTGGTAGGGGAGTTCCCCCATCATCATTG
TATTACACATATGCAAATGAGTAATATTGTAGCTATTGAGAAGTTTCCATAAATGACCCCTTTGAACTGTTGTCTAAATATTGTT
AGTAAATTAACCTCTCTAATAAAAAATCTTCAATTTCTATATTGTAACTATATAACATGGCATAAAGTGTATTCTGTGTGCTAAGTA
AAAAATGAGGCAGGCTAAGTATACACAGCAAGACCTTGACAGCTGTGTTTTTATATATTCTAGGTACATTTTGTAGTATGAG
CTAGGCAGGCATCATACTGAGCAGAGGGAAATCAAATATAAGAAAGGTAGCCCGGTTCTCATCAGAGTGGATTAACGTGTGTGAAG
25 TGGGGTTTACAGGTCCTCAGCTCTAACAGATGTCTCTGTGCCCAAGGATGCTAGCAAACTCTGAAATGTTCAATGAAACCAAGAG
AGCTGATGCTCAGCTCTGATCACTCCTTCTTAAGTTTGGTAAATGTATATAATAATTTAAAAATGCACTAGCCCTCTATACA
TTTTTAAAAATACATAGGTTAACACTGCTATAAGTTTAGCAAAACATACCTGCATATTTCAGGGTCCAGCTGTCTTTGTACCTTT
TGATAGACCAATTTTAGTAATTTGATCATGAGTTTGTGTTGGAAGGTGAACATTTGCTCTTGATGGTTTTGTTGTTGTTTACTGTGA
ATGTTTACTCTTGGTATTTTGACTAAGCCTTATGGCAAAATGTAATTAATAAAATAGTATTTTGAACATATATAAATCTCT
30 ATATACTTTTTTAGTTTGGGACAGGTTTTCCATAATCCAGGGTAGCCTAAAAGTTGCTAGGTAACCAAGGTACCCTTGCCTCCA
TCTCTAGTGCTAGAATTAAGGCACTGTACCATGTGCTCTTATTTCTATTAACAATTTCTTAGGCAGCCTATGTTTGTGTTCT
CTTGATCTCTCTTATTATCAGTCAAGAACAGAGTCTGTGAACCTAGAGTTTGGTGGCAGAGAGTGACTTTCTGATGATGTT
TGATTTTGTACATCTTTGTTTAACTATGATGTGATTTGAAAGTTTCATTTTTGCTTTTAGTTTTCAAAATTTGGGTATTGCG
TGTGTAAAGAAAAAGGAAGTGAAGAAAGCTATTATTTAAGGATTAGTGCAGAAATCAATCTCTTCAATGGTAAGTGCTTTGTTAT
35 AATTTCTACTATTTGTTATTACAGTGGACTGTGATTTCTATTTATAGTATAATCTACTTTGTGACTTGTATTAAAGTGGAAAGCCT
CCCCCTCCTGTTGTTTTTTAGTGTGAGGCTTTTATAGTAGCTCTGGCTGCTCTGTTACTACTAGCTACTCAGATTTGGCCA
TGAATCTCTAGCAATCTCATCTCATTGGCCCCAGGTTCTGGGATCTGTAGATGTGAGCCACCATGCTCAGCTAAAACAGAAAAACCC
CAAACTGAAACCTTCTCCAAGTGTTTTTGATTTCTTCAATATGCTCTCTTTATGCGCACTCTACCAACCTCAGGATCACCCTT
CTTTCTAGAGTTGGTGAAGCACTAGTTTATAAAGATTTCCTCCTTTACCACTAGTTTAAATAGTATCTATACAGCC
40 AGCCAGCTTGAATTGCTGCTTTGCTGAGGCCGGCCTTGGGCTCTGATCTTCACTTTCTAAGTTGTCAATCAGGCAGAGCTCCA
TACCTGGCCACTCAAATATTTTGTAGACTCTCTTGATTTTTTGTATGAATTTTGTGTTGATGTATGTATGTATGCTACCACAAAT
ATAGCTGGAGTGCAGATCTCTCAGAACTTGAAGTCTGCTGCTCTATCTCAAGTCTCCCTGCTGGGGTTATAGACATACACCACA
CTGCAAGAACAAAGTACTCTTAGGTACTAAGGCATCTCTCAGCCCTTCAAATATTTTGTAGTCTGTTTTGTATTGGTAAA
45 ATAAATCTTACTGTTTAGTACATTTTATGTGAATAGCACTACTAAGTGGTTGTTTTTATTTATTTGTTTGGGGACAAAGCCT
TACCACATTAATAAAGGCTAATTTCAGATGCTGTGCTCTATCTCAAGTCTCCCTGCTGGGGTTATAGACATACACCACA
TTTTATAGTTTAAAGCATTGTAGTTTGTGTTGTTTTGTTTCTGTTTCTGCTTTTGAGACAGGGTCTCATGTATTCTGCACTGGTC
TCAAACCTCACTATGTAGCAAGAAAGTGAATTTCTGATCCCTGCTCACCCTCCAGTCTGGGATCTCTCAGATTCATCA
TAACACTTTGGCTTGAATCATGAGATTAATTAATCAAGTTTGTGTGCTCAAGAAGCACTCTGCAAAATGCTGCTCTCTT
50 GGCCTTTATGACACTCTGGGTATGGCATCTGTGACTCTTTAGCATTTCTATATTGTTAAGTAGTAAATGATTCCTAAGTGTATGCA
GTTATTCTATGTACCTATTTTAGTAGTTTTGTTTGCTAGGCATGGTGAACAACAGCTGTAATTCAGCTACTTGTAGATGTGATCTC
TTAAACTTACTGTGTAGCTACGGGTAACTGTAATCTGTTTGAGCCCTTTAGTCATTTGAAGGAAGGTAATAACCAATTTGTATGTA
TCTTATCTTCAAGTGTTTAGTGAATAACAAAGTAGCAGATACACCCTTCTGAGTGCATAAGACTTTGGCTGATAGTAGAGAA
GTGGCACTTGTAGGTGACAGTCACTGATGATTAAGAACTAAGTACAGGGGGCTGGTGAGATGCTCAGCGGTTAAGAGCACTGACT
55 GATCTTCCCGGGGCTCGAGTTCAAAATCCCAACCACTGGTGGCTCAACCACTCTGTAATGAGATCTGAAGCAGCTAAAGT
GTACTACATATAATAATAATAAATCTTAAAAAATAAAGAAACCTAAGTACAGATCTGGTGTGCTGGCTGCTGAGAGAGAAAGG
GATATTTTTGTATTCCAGGATAAAGTTTAGGCTTTATAGAAAAATTAGTTCGGGTAGGGAATATGACCAAGTAAGTGAAGTAAAGC
ATGAAGATCTGAGTTCAATCTCAGCATCCCTTGACAAGAGCTAGGATTTCTCAACCAACAGGAGGAGTGTCCAGGTGGAGTTCTG
GAGCTGGCAAGGCTCAGTGGGAGCCCTGCTCAAAAAATCTTAGTGTGATGATCTTAGTGTCTATCTACGCTCTCAGTCTCAGTATGCT
TATCTGTACATACTGTATACACACAAAGCAGTTATTAATGAAATTTTCACTTTTACTCTTAACTCTTATACTTGAATAAATCCACCCAGA
60 TGGTTGTGCTAGTATTTTTAACCATGTGCTGACAGAGATGGGAATAATATTGATAAAAAATCAAGTTTCTACATACTGAAAAAA
TTCAAAGCAAAATATCCCAAAATATAATCTTTGTGAAAAATGAAATTTCTTGCTTTGATAGAATCATGGGATGCTAAATACATTT
ATATTTAGTTTATTAGCAATTTATTTTTCTTAAATAATCATTTTACTACTTTAACTCTTATACTTGAATAAATCCACCCAGA
TACAGTCTTTTCACTGAATCTCAAGGCAGAAACATTTCCCCCACTCCAAATTTGCTTTGATCTTTCTCAATCATTTCTTCTCT
CCAGCTCTTGGCCCCAGTCAACAGCTCACTCTCTTTGTCAGCACACCTAATTTTCTAGGTTTTATAGAATGGAAGTATCTTT
75 TTATATCTTATATCTTTCTCGCTGGCTTCACTGGTCTTACTGGTTTTGACGTGATATTGTTGGAAAAATATAACCATGATTTG
TTCTTTATGCTGAGTATTTGTTTCATTGTATGACTATACACACTTGTTTCTATTAACAGAAATTTTCTGTAACTGTCCAGGAC
CACTTAGCCATCATTTGTTTGTGCTGCTCTTCTGCTGCTGTTTGTGTTTTAATATTGATTTACTCTTTGAAATGGAAGAC
ACTGAAACCTTGAGCTCTTAAATTTATTTGATTTGATTTAAATGAGACTTTAGTAGTCTGCACTCTTACTGCTGTCTGCTGCTCCAG
CAACTGTGCTACTGTGATACAGGTGCTGCCCTCTTAGCATTTTGAACCTCATATTTCCCTTGAAATGATGATGAGGGTGGGTAC
70 CTAGGTATGGAGGCAAAAGGACTGCTCAGATGTTGCTCCCAACTTTTCCGCTCTCTTTTGAAGTGGGGTCTCTATCTGCG
GGCTTAGATGGGCAAGGATACCTGCTCTGCTCTCCGCACTGAGAATATTACAGGAGCTGACTACTACTGCACTGCACTGGCTCT
ATTGATGGGTTGGAGGTTGAGCTCATACTGCAAGGAAAGTACTTTACCAGTGAATCATCTCTCAGCCCCATTTTGACCTT
TCTAGTTGTACAGATATGTTTTATAGACTCAAAATGTAGGCTTAAAGATGCTGATAGTGAATAAATTTTCAAGTTTATGACATAACT
CCTGAGACTTTTGTAGCTGGCTTTGTGTGAGATATGTTTTTAAATAAGTATCACTCTGAAGCTGGGAAATTTAGCTAAATTT
TTTATATTTAACTTTTTTAATTTTAAATCATAGTGTCTTTTCAAGTAAATTTTCTAGTAAATTTAGTAAATTTTATGTTTTTAA

579

580

AATAGTAGTCTCAAGAAGTACTTGAAATGCCCTTTCAAGGAGTCTTGGGTTGGTTAGATGGTTAGTTGGTTGGTTTTGAGATAGG
 ATTTCACTGGGGTTTTGGGCATGAACCACCATGCTGTTTTTAACAAGGCACTGAGCATGGAATCTAGGGACTCATGTCATGCTAAGCA
 AGCATTCTGCTGCTGAGCTACATCTTCAGTCTTGCAGGCTTTGGTCTTTATTTATTTTGGAAACAGGGTCAAGCTGGCCTAGATCT
 5 TGCTGCATACCTTCAAATTCATGGTCTTCCACCTCTGCCATCTGAGTCTTAGGATTTCAAGTTGAGTCAACCTTCCCTCTCCA
 ACTTCATTCTGGTTTAAAGCTCACTTCAATTTGGTTTCTCTGATTCCATACATATCTTTGATGGGTCTGCTAAAAATATCA
 TTGGAATATGATTGCTTTTGTCATATTAACCCATCCTTGAAGTAATCCACATGGTCAAGTGAAGTACCTTTTGGATGCTGT
 TCAGTTTGCTTGATAGCATCTTAAATTTTTTCATGTATGTTTCATCAGGGGACTGGCCTGAGTTTGTCTTAATGATGCTTTGT
 10 TGGATTCTGCCATCAGAATTTGGCAGCAATCTCTCTGCTTCTTTAGAACTCTTGCTGCCAAGCTGTATGACCCCAATTTACATC
 CCCAGAAACCATGGTATTCAAGAACTAACTTACTCCCAAAATATCTGACTTCTTACAATGCTGTATCACAATATGGACA
 TGCACATGATAAATATAAGAAATTTATTTAGAAAAATACCATTTTCCACAAATGGAACCTGTATCTTTTAGAGAAATGCTCTAT
 TTTGTGGCTAGTGTAGAGGAAATACAAAGCCTGGGATATTTTATTTTACAAGAAATATGCTCAAAGAACGATGGAGATAATGTTAG
 AAGGGCATAGGAATGAGCTTGAGAATCTCACTGCTCAGAGTAATATATAGAAATAATATCAGTGGCAAATTACCAAGTCATTGAA
 TAAATGAGAATCTATTGGTGACAGTGTCTTGTCTTGGTTTCACTTCCCTAACACCACAAACACAAAAACAAAAACAAAAA
 15 ACACAACCCAGGCTTCACTCCATCCATAAAGTAAGAAATGAGAGAAGGCCCTCTCTCTCAGTGGGATGCCATTCAATACATGT
 GAAAAGAAATGACACACATTAGCAGTTATACTTAGAATCAGTAGTAAGTGAAGTCAAGTGAAGATCTTTGGTGGATTCCAATCAAATG
 AGTGAATATCTGGTCTATCTGCAAGGCACTGAGTAGAGAGGGAAGGACAGTAAGACTGGAAGAGTTGATAGACAAACCCACCC
 CTCAGGACTAGAAAGTTTGGCAAGATGCAAGGAGGAGCACTCTCTCGTGGTGTCTTCACTCTTAAATCTAGTACAGGCAAA
 CTGGAGCTGAGCATAGCCCACTAAATACTGGGCTGAAGCTGTGCAACCGCTTATGAAGCTTAGCATACACCGACTACAAAGCAG
 20 GAGGGCTCGGTGATGAAGCCAGTGACAGACAACTGATGGACAACCTCAGCGATGTCTTCCGACTAGATAATGGTGGTCTGTGAGA
 GCTCACTTCTGGTATGGTGGTGGCTGTGATTTACAAGATGCTTCTAGGAATATGCACTATGTATGTATTGAAATGGTGAG
 TGGTGTGCTGACTCAGCACCTCTGTGGAAAGTTCTTTGACTTTTGTAGTTAAGTTTGAATCATTGAAAGGAAAAAAATTA
 AGATATGAAAGTAATCTTTTTCATAATAATAAAACACAGATTCTGCCAGCTAGTTTATGTTAACTTTATACAGGCTAGGCTA
 TCTGGGAAGAGGGAATCTTGCTTACTGATTGATGTGGGAGGGCCCGGCCACTGTGGTTAGAGCCACATGGTCAAGGCTCATGGCC
 25 CTGAGTCTATGCAAGAGCAGACTGAGCAAGCCATATAGAGCAAGCCAGTGAGTACGCTGCTCGTGCCTTCTGTTGAGTTCT
 GCCCTGACTTCTGTGATGGAAGTGAAGAGAAATAAACCTTTCTTCTCATGTCCATTTTAAACCACTCAGAAAAGCTTA
 CATCTGAGCTGGGGTGTGGCTCCTGAGTATAATCCAGACACTTTGAGAGGCGAGGAAGGAGAATCAATAATCAAGTCTAGTC
 CAAGCTACAAAGTGAAACCTCTCTCTGTGGCTCCCTCACAAAGCTACTTCACTCAGTTCTTCTCAAGTGGAGATTAAAT
 AAGACTCAGGAGTAGAAATAGTAGATGAGCTGGCTGATGAGGACTGCTGAGACATAACCTTCTCAACAACATCACTTGACTGTAGC
 AATCATGACCTCATGGTAACTGAAGATGCTTGAAGTGGTGAAGAGAGATCAGGGGCTCTGTGCTCCCCAAGAACTACTAGCTGT
 30 TGATAGATGCTTGAAGAGCCATCATCTTAAATGTTGCTTCTGTTTGGAGTTCACTAATGTTTATCATCCCTGCCACAAAGGTAG
 TTAATACTGTAAGACCCCGAAGCTGGGCTCTGCTCAAGTCCCGGATGAGCTGGCCAGCACCCAGTGTCTGAGAGAAAACCA
 CACCTGATGCAAACTGCAAGAGCCATGCAAGGCGAGGGAGTTCAACCCAGAGCGGTGACAGTAGGGGGCTTTTAAACAGCTAGCTGA
 GGAATTGGGAGGAGTTGGGGAGAGAGTTCTTTCAGCATGTCCTTGGTGAATTTACAAGCGGGAGTGGGGAGTGAGTTCTTTCT
 GAAATTTTATCTCCGTGCTCCTCGGCACTGGAACCGCAGGCTCTGCTGTTTGAAGTATAGAAAACAAAAGGCTTTTGTGCTGCTAT
 35 AGAGAACAACGAGCTTCTTCTGGCTGTATTTTAGAGATCAGGGAACCAAGCTTGGGGGACGCTCCAGGGGCTTTACCTTCCAGG
 GAGAAACGCTCTAAGTTGGGGGTCTCACAATACCAGTGGGTCACAAAACAAAGGCATTACAGTACGAAGAGGCTTGTAGGGAGGC
 CTTTGTGGGGGTGGTGGGGGATAAAGTAGGGGTCAATGTCTAGTACAGGCCATGAATCCCAAGTCCCTGGAGGAAGGCAGAA
 ACTTGTGAGCTCTAGGACAAACAGGACTCAGAGAGAGAAACCTGTCTTGGAAACAATACAGAAAAGGACTGGGTAAAGTGTGACCA
 CTGTGTATATTCATGTATGAGACTGGCAAAATAAATTTAAACAAAGAAATACAGCCCCAAGTGAAGAGAAATGCTTGTGTCT
 40 TTAGGAAATAGAAATTTAACTTGTAAAGTACTTCACTAACTTGAAGGTAAACCAAGTTATCTTACTAGGAAGATTCTCCCTTA
 TCAAGTCTTTTCTTCTGCTTCTCTGCTCTCCAGAGTTGGGTGGTTTTTCCCTTCTGAAAATAAGCTACAGCTTATATCTGC
 AACACAGATAAGAGAGAGAGCTCATTTGTCAGATGACATAAACATGCTTCTAAGTTAAACAAAGCATAGAGAAGAGGATACACT
 GTAAGCCAGTGACACAAACCCACAAGACTTCTAGCCCTGTGCTCACTCCCAAGACATGTCTATAGCTGTTCCTTACCTT
 CAACAGGAAATAATCAAGGAATGCTTTGTGGAAGTTCTGACCTTCACTGTTTGGGTCCAGTACATTCAAACTGAGCTAAAAA
 45 AAAACAATGCTCAAGAGCTTTTCCAAATATTTAATCTTTAGCAAAATTTATCAGAAAGCTGAGAAACATACATGAAGTCT
 TTAATTTTCACTTTTCACTAGTTAGTTTCTGTTATCTCTTCAATTTTCTGACAATGAAAACCCCTTGTCTATTATTACACACA
 TGATGAAACAAGGTTTCAAAGGAGCAGGCTGCCCTTTCATCGCAATCAAAACATCTTCTGATATAATACATCTTTCAGAGTCAG
 TATGAATGTGTGCAAGATGAGAAACGTGAATATCAATGCTATTCAATCAATGATCAAAAAAGGCTCAAGAGTTGCACTAG
 50 CTGATGAAAATTTACTTAACTCAAAATTTATTGAGCTTCCCTTCTGGTATTTTGTATGATTAACTTCTTGGTCAATATGTTT
 AAGATTCTCTTCACTGCTTCAATTTACAATTTGACAAATATGAGATCATATAAGACATACCATTAGCCATTCTTGGGGGCTCACTT
 GATATCCAAAGTTCCAGAGCCCACTCCTGGCTTGTGAAGCTTAACTGTCTTCTAGGACACTGTCAACCCAGGAGATGCAAGGT
 GCTCCTGCAAGGGTTTTAGAAAGGCTCCTGGAGACACAACATCAGCTCCAGACCTGTTATAAGAGTAAGTGGTGTGTCATTTA
 ACTTTTGTCTTCTTGTATGTAATCAGATGTTAGTAGACACTTGAATTTAGAAAACATTTGAAATTTGAAAATTAATGAAACA
 55 CCAAAATATGTTTGTATTGTTAGCATTATCGAATTTTCAAATTTGTAACCTGCGGACAAAGTTACTGAAGGCACTTGTCTCTC
 TTTACATAAAAGACAAAAGAGGTAGGCAGTGTCTAGAGTACGCTCCAGGGTAAGGTGTCACCTGCTTTGACAGGACACATACT
 GACAATTTTCGATTGTCAAATAGTCACTTGAGGTCAAGGACTATGACAAATGTTCTCT

MOUSE SEQUENCE - mRNA

CACTAGTGACCGGAGCGCAAGATTGCGGGGTGGGAAGGTGTGAGCCGCAACCCAGAGGAGCGGGGAAAGAGAGGAGGCCCGGG
 60 GGTGGTCCGAGGACAGGCGTCCCGGCTGCGGAGGCTGCTCAGCCTCTCACTGGTTGGCTGACTGACGGGCTAGCTGGCTGACTGC
 CTGCTGACCGACTGCTGGCTGACTGACTGACTGACTGACTGCTGCTGCTGAGCCTCGGGCCGAGCGCTGGAAGCTGCAGC
 GAGCGGCGCGGAGCGGAGCCATGGCCTCGAGTGGATATAATCCATACGTAGAAATAATTGAACAGCCAAAGCAGAGGGGAATGC
 GGTTTAGATACAAAGTGTGAAGGCGATCAGCAGGTAGCATCCAGGGGAGCGCAGCAGACACAAACCGGACATACCCGCTGTGC
 CAGATTATGAATCTATGGAAGAGGAAATAAGAAATACATTAGTAACAAAGAAATGATCCATATAAGCCTCATCTCATGATT
 65 AGTTGGAAGAGATTGAGAGATGGATACTATGAAGCAGAATTTGGACCAGAACCGAGACCTTTGTTTTTCAAATTTGGGTATTC
 GGTGTGTAAGAAAAGGAAGTGAAGGAGCTATTATTTAAGGATTAGTGAGGAATCAATCCTTTCAATGTGGGTGAACAGCAG
 CTGCTGGACATTGAAGACTGCGACCTCAATGTGGTGAAGTGTGTTTTCATGTTTTCTCTCTGATGAAGATGGTAACTTCAACAC
 TGCTCTGCTCCCTATTGTTTCAACCAATTTATGATAACCGTGCCCCAAATACTGCAAGATTAAGGATATGCGGTGTGAACAAGA
 ACTGTGGAAGTGTGAGGGGAGGAGATGAAATATTTCTGCTTTGTGACAAAGTTGAGAAAGATGATAGAAAGTTCTTGTGTTG
 70 AATGACTGGGAAGCCAGAGGTGTTTTTCAACAGCTGATGTACACCGCAAGTAGCCATTGTTTTCAAGACTCCTCGTATTGCAA
 AGCTATCTGGAGCCTGTGACAGTGAATAATGACAGCTCGGAGGCTTCTGACAGGAAGTTAGTGAGTCTATGGATTTAGATACC
 TGCCAGATGAAAAGATGCAATGGAATAAATAAGAAACAAAAACAACTCTGATTTTCAAGAACTGTGCAAGATTTGGT
 CACTTTACTGAGAAAACAAAGACTGCCCTCTGGGATCACTGGAGAAGGAAGATTATCAAAAAAGAACTCAACTTATTTCTCA
 TGGTACAGTTTTACCAAGATGCCAGGCTCTCAGGAGTTCCAGGGCAAGCTGAACCTTACTATTCTTATGCGGGTCCATCTCGA
 75 GTGGATTGCCACATCAACCCAGGCACTCCCTCAGTGGCCCATCAGCTACAAGCTGGCCACAGTGACTCACCACCTCACAC

CCAGTCAGTACAAATACCTGAGTACTTTCTCAGCGGGAACACTCTCTCTAATTACAAAGGTATCCTTCCATTCCTAGAAAGGGCC
 TGGTGTGAGCGACTTGAGTGCATCTAATTCGTGCCTTTATAATCCTGATGACCTAGCTAGAATGGAAACGCCATCCATGTACCAA
 CTGACTTATACAGTATCTCTGATGTCAACATGCTATCTACTCGGCCTCTGAGTGTGATGGCAGCCAGCACTGATGGCATGGGGGAC
 5 CTGACGAAACCAAGACTTTGTGAGCATCAATCTTGAAACCCCTCATGTAATGCCAGGCTAGGCCCAAGAGACCTGAGAACACTACA
 TCAGATGTCTCTGCCAGTCTGTCCGCGGGCACCAGCTCCAGTCTCTGTTTTGTTCACAGTCAGATGCATTTGATAGATCAAACT
 TCAGTTTGTAGATAATGGCCTGATGAATGAGCCTGGACTATCAGATGACGCAAAATAATCCTACCTTTGTTTCAGAGCAGTCACTAT
 TCAGTTAACACTCTGCAAAGTGAGCACTGAGTGTATCCCTTACATATGTTTTTTTAAATATAAGTTGTAGGACTTAAATAAGT
 ATATAGAAATATTAAGAGAAAGTTGAGAGTCAAACTTTAAAGCCGCTACTGTTTCTTACTTTGAAAGATATGCTTAAAGTCCAC
 10 GTGCTTGTCTGAGTTGTTTTCTGTATTTCCCAAGACAAACTATGTATCTTGTCTAATGTATTAGTTAAATGAGATGATATTTGC
 TTTCAGCAGATTTAAGGTGAAAAACGTGTAATGGCTATGCATTTGGGTAATAAATCACTATATTATTGTTGAGGCCCATAGGCCAAA
 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

MOUSE SEQUENCE - CODING

ATGGCCTCGAGTGGATATAATCCATACGTAGAAATAATTGAACAGCCAAGGCAGAGGGGAATGCGGTTTATAGTACAAGTGTGAAGG
 15 GCGATCAGCAGGTAGCATCCCAGGGGAGCGCAGCACAGACAACCGACATACCCGTCTGTCCAGATTATGAACACTACTATGGAA
 AAGGAAAAATTAAGAAATTACATTAGTAACAAAGATGATCCATATAAGCCTCATCCTCATGATTAGTTGGAAAGATTGACAGAGAT
 GGATACACTAAGCAGAAATTTGGACCAAGCAGACACTTTGTTTTTCAAAATTTGGGTATTTCGGTGTGTAAAGATTGAAGAGT
 GAAAGGAGCTATTATTTAAGGATTAGTCAGGAATCAATCCTTTCAATGTGGGTGAACAGCAGCTGCTGGACATTGAAGACTGCG
 20 ACCTCAATGTGGTGAAGTGTGTTTTCATGTTTTTCTCTGATGAAGATGGTAACTTCACAACTGCTCTGCTCCCATTTGTTCT
 AACCCTATTTATGATAACCGTGCCTCAATACTGCAAGATTAAGGATATGCCGTGTGAACAAGAACTGTGAAGTGTGAGGGGAGG
 AGATGAAATATTTCTGCTTTGTGACAAAGTTGAGAAAGATGATAGAAAGTTGTTTTGTGTTGAATGACTGGGAAGCCAGAGGTG
 TTTTTTCAAGCTGATGTACACCGCAAGTAGCCATTGTTTTCAAGACTCTCCGTATTGCAAGCTATAGTGGAGCCTGTGACA
 GTGAAAATGCACTGCGGAGGCTCTTGACCAGGAAGTATGAGTGTATGGATTTCAGATACCTGCCAGATGAAAAGATGCATA
 TGGCAATAAATCAAGAAACAAAAACAACCTCTGATTTTTCAGAACTGCTGCAAGATTGTGGTCACTTTACTGAGAAAACCAAGAA
 25 CTGCCCCCTCTGGGATCACTGGAGAAGGAAGATTCACTAAAAAGAACTCAAACTTATTTCTCATGTACAGTTTACCAGAAATG
 CCCAGGCTCTCAGGAGTTCAGGGCAAGCTGAACCTTACTATTCTTCATGCGGGTCCATCTCGAGTGGATTGCCACATACCCACC
 AGCCATCTCCCTCAGTGGCCCATCAGCCTCAAGCTGCGCCAGCTGACTCACCCACCTCACCCAGTCACTACCAATACCTGTA
 GTACTTTCTCAGCGGAACACTCTCCTCTAATTACAAAGTATCCTTCCATTCCTAGAAGGGCTGGTGTGAGCGACTTGAGTGCA
 TCTAATTCGTGCTTTATAATCCTGATGACCTAGCTAGAATGGAAGCCCATCCATGTACCAACTGACTTATACAGTATCTCTGA
 30 TGTAACATGCTATCTACTCGGCCTCTGAGTGTGATGGCCACCCAGCACTGATGGCATGGGGGACACTGACAACCCAAAGACTTTGTA
 GCATCAATCTTGAAGACCCCTCATGTAATGCCAGGCTAGGCCCAAGAGACCTGAGACAACATACATCAGATGTCTCTGCCAGTCTG
 TCCGCGGCACCCAGTCCAGTCTGTTTTGTTTTACAGTCAGATGCATTGATAGATCAAACTTCAGTTGTGTAGATAATGGCCCT
 GATGAATGAGCCTGGAATATCAGATGACGCAAAATACTCTACCTTTGTTTCAGAGCAGTCACTATTCAAGTAACTCTGCAAGTG
 35 AGCAACTGAGTGATCCCTTCACATATGTTTTTTTAAATATAA

HUMAN SEQUENCE - GENOMIC

AAACCAAAGCTGCATATGAAAAAGCTCTAGAAGACAACACATACACACTACTCACACATGACGAGTGGTGTGCTGTATTAGT
 GAGGCAGAAATATAAGTGAAGTTTTCTTCTTTCTCCAATCTTTATTTAATTTGTTTATTTGTTTTTATAGAGACAGGGTCT
 40 CACCATGTTGCCAGGCTGGTCTTGAACCTCTAGCCTCACTGATCCTGCCACCATGGTCTCCCAAACCTGCTGGGATTACAGGTGT
 GAGCCACCATGCCAGCCTTTCTTTAATGTTTTATATGTGCTCTTTTATAGTTGTAATTTAAAAATAAACATATTTTAGCAAAAA
 ATTAAGAGCTTTGAATGTTATTAAGAAATTAGTCCGGGAGTAGTGGTTACGCTCTAATCCAGCAGCTTTGGCAGGCTGAGGT
 GGGAGGGTCTGTGAGCCAGGAGTTTGAGACAGCTCTGGGCAACATAGTGAGATTCCATCTCAATCTAAAAATAAATAAGTAA
 AATATACATATGAACCTAGTAACCTGGTTGGCCAGCTTGCTTCTTCATGACAGTAATCCATGATTGTTGACATCTTAATAT
 45 AATCACTATCATACCTCTCTGCAGGCATAGTTATCACTTTGGGTAGGAGTTGAGCCTTGTGCTCTTTTGTCTTTCTTGATGGTA
 TCTAACGCCAGTGGTGATACATTGTCACTATCAATAGTGTGATTCAATGTGTAATAATTTATATTTATTCGACATTTA
 ATGAGCTTCTAATGCTAAAGGCAGTGTACTAGCCACTCTAGGGAATAAAGATGAACAAGACACAGTCAATGCCCTTAAATTA
 GAAGTAATGCACTGATTTTTACTTTTCTACACAGGTATTGAATTGAGAATTTTGGGGAAGAACATGAAGAGTCTTAAAGAT
 ATGGAACCTGTGAACGCTAAACCTTCATATATTGCAATTTTATAGTAAGATTATGGCTGCCAGTTATATTGTTTATATCTTAG
 50 GTCATATTTGAAATGTGATGTGACATAGTGAAGAAAGAACAAAGAGTCTGGAGGTCTGGTTCAAGTTTCAAGTCTCAGCAATTAAC
 TACCTAATGAACACGGGCAAGGTACTTAACTTCTGTGCTCATTTTCTCATGTGTAAGAACGAGGAGATGAACATAATGATCT
 ACAGGGTCTCTTCAACCTTAAATTTGAACCTAATCTCTCTGTTGAGACATAAAGAGGCCACCATATGACTTGAAGGTGATGATG
 ACTTCATTACTTGTCTGAAAAATGTTAATTTCAATTTGGAACAAAGTAATCACTGGATCTCATGGTTGTGACATCAGACATTAC
 TACAGTTAGAGAAACCAAGTTAGCACACTGTGTCTACTTCTAGGCAGTGTCTATACGCAAACTAGCATACCAAGTATAGGG
 55 CCTACACATATAAACAAAAAGATTAAAAAGAGATTTTTTTTTTTTGTAGATGTAGTCTTGCTTGTGCGCCAGGCTGGAGTGC
 GTGGCAGAGATCGGCTCACTGCAACCTCTACCTCCAGGTTCAAGCGATTCTCTGCTCAGCCTCTGAGTAGCTGGGATTACA
 GGCCTGCACCACTATGCCAGCTAATTTTTGTATTTTAGTAGAGATGGGTTTACCATGATGGCCAGCTGGTTTCAAACTCC
 TGACCTCAAGTGATATGCCCGCTCGGCCTCCCAAGTGTCTAGGATTACAGGCGTGAGCCATGCGCCCTGCCGATTTTTTTTTT
 TTTTTTAAATAGAGACAGGGTCTCGCTATGTTGCCAGGCTGGTTTTGAAATCCTGGGCTCAAGCAATCTCTGCTCAGCCTCC
 CAAAATGTTGAGATTACAGGTGTGAGCCGCTGTGCCAGCCAAGAAAAATTTTAAACAATGGATATTTACGAATGCTTTTGGAGT
 60 TTTTATGTAAGATTTTCAATTTCTCTGGGTGTTCAATTAATCTTATGTTTCAGTTCTTAAATGAAATAGGTGAGTGGGCGAGGT
 TTCTCAGAGGTATAGTTTTTACTTTAGGGACTATCCCTTCTCTTAAAGTGTGCTTTAAAGACGGCAGCACATGAACCTGTCTTA
 GATAGGAGGGACAGCAGGCAAAAGTATGACAGGATCTGGGTCTGCTGCCACACCAAACTATTTATGAATTTTTTTAAGAGAC
 AGGGTCTTGTCTGTCAACCCAGACTGGAGTGCAGTGGTGTGTTTATAGCTCACTGCAGCCTCAAACTCTGGGTTCAAGTGATCCT
 CCCACCTCAGTCTCTCAAGTAGCTAATATTACAGGTGATGCCCCCAAACTGGCTAATTTTTTTTTGTTTTTTTGTACAGATG
 65 GGGTCTCACTATGCTGCCAGGTTGGTCTCCAATCTCTGCTTCCAAAGTGTGGAATTACATGGGTGAGCCACCACTGGCT
 CTCATTTCTTATGGGTTTTTTGTTTTTTTTTTTTTGTGCTTAAAGTTTGTTTTTTACAACTTATAAATCACATAATTGAGTTTC
 AGAGATCTCAACAATACTAATGCAAGTAAGTAAACAGGAGAGCAGGAGTGGGGTTTGGCCAAAGTACTGGTAAAAATTCATCATA
 GTGGTTGAACCCAGCTGTTGAGCTATTTGCTTAAATAGGAAGGACACCTCTCACTACAGAGAGTTGGGAGTGATTTGAGTA
 70 TGCTAAGTGGGACTAGGGCATACTCTGATAAGGTTTAAATTTTTGTAAGAGAACCATGTGGCTTAAATTTGATGTAAAGCATCTAC
 ATAACTACATAACGGAAGACAGGTAACCTAGATAATGGGCTATCAAGACGAAATTTGGCCATTTATCTAGAAATATCTGAGGG
 AGAACCCCAATGAATCAACAGATACAACTCACTCTGTTTATTAGAGTAGTGAAGAATCACAGTCATACGTGCTGACTTATTGAGA
 GGGCAAGTACAGTGTCTGCAACTTATTTGAAATACATTTTAAACACAGATAGATGGAATGGAATGAGGAGGATGGAAGAA
 TAAACAGACAGGTGATAAGGCAAGTGCAGCAAAATGTTAATGGTGAATCTAGTTAGTGGGTATACATATGTTCCCGGAAAAAAA
 75 TCTTTCAGTTTGGCTGATATTTGAATTTTTTTTTTTTTTTTTTGTGACCGGCTTTCTCTGTTGCCAGGCTGGAATGCAAGT
 CCAGGATCATGGCTCACTATAGCCTTGACCTTCTGGGCTTAGCTGGAACCAAGGATATGTTTACACACCTGGCTAATTAATAA

5 AAAAAATCTTTGTAGAGATGGTGTCTCATTTTGTGTCCAGGCTGGTCTGAACTCCTGGATCAAGCGATCCTCCACCTTGGC
ATCCCAAAGTGCTAGGATTACAGGCATGAGCCACCATGCGCTGGCCCCAACATTTTATGATAAAACAGGAAAAAACCTGCCAAC
ATTTCTGAGGGCTTTCCTGTGTGAGGCACTTTGTATTAGTGATCTCAATTAGCCCTCACAAGAGGCTGTGAGGTAGGTACCAT
10 TTACTACCCCTAATTTACAGATAAGCAACAGGCACAGAGGCTAAGGGACTTGCCTCAGAGTCTCAGAGCTAGGACA
AGCTAAGATTCAAATCCAGGCCTGTGTGTTTGCAGAGCCAGGCGCTTTAGCTGTGAAACACAGAGAATTCGCGAGATGTTTTT
AGCTCCATTAAATATTACTGAGTATTATAAACTTCTAGAACATAGGAAAATATTTTCATAACCTCAGTCCAGAGAGGTTCTCT
AACATTCAAAAAACACTATCAAGAAAATAAATCAGACTTAATTAACACTAAGTTAAAAAGCTTCAAGATAATGAAAAGGC
AAGCCACAGACTAGGAGAGGATCTTGCATATCATATATTTATAACAATTCGTGGCATCCATAGAGGTGCTCTGCTCAGATCTC
15 CATTCTAGAGAGGATCTGCTCAGCTTCAAGCCAAAGCCACATATTTCTTGGAGCCACTACCCAATTATTAAGTACAGAGGTA
GTATAAGGGCTAACTATCTCTGTGCACAGTGTGTTGTGTTAGAGCTCCCCATTGGATTACTGAGACTTCTCAAGATGCACTCCC
ATCTCATTTTCTTTCTACCAAATTTACCTTCTTCCCCCTTCTTTTACCAGTGTGACACCTGCATCTTAAGATTCTTCCCTGCC
ATAACTTTTTTCTTCCCCCTTATCTTTTCATAGATGTTACCCCAATAAATCTCTTGCATGTTAATTTTCATATTGTTACTTGTCT
CCCAAGAGCCCACTGGTATCTCATATCCAGAATACATAAAGAAATGCTACAAATCAATAAGAAAAAGATAGATAATCCAATTT
TTTTTTTTTTTGTAGATGTTTTCTGCTCTGTCCCCGGCTGGAGTCTAGTAGTGGTGACATGGCTCACTGCAAACTCTCTCGCCC
20 CAGGTTTCAAGCAATTTCTCTGCTGAGCTCCCCGCTAGCTGGGATTACAGGCACCTGCCACTGCACCCAGCTAATTTTTTATAGT
TTTTAATAGAGACGGGGTTTCAACATCTTGGCCAGGCTGGTCTTGAACCTCTGACCTCATGATCCACCATAATTTTGTATGTAA
GCCCTATCATT
TACAATCTCGGCTCACTACACCCCTGTCAACCGAGTTCGAGTGATTCTTGTGCTTCAAGCCACTGAGTAGCTGGGATTACAGGCA
25 TTGCGCCACCACACCTGGCTAATTTTTGTATTTTAGTAGAGACAGGGTTTGCCTGCTGAGCAGGCTGGTCTCAAACTCTTGGAT
TCAAGTGACCCACCTGCTCAGCCTCCCAAAGTGCTGGGATTATAGGAGTGAGCCACNNNNNNNNNNNNNNNNNNNNNNNNNN
NN
NN
NN
30 NNN
NN
NN
NN
NN
35 NNN
NN
NN
NN
NN
40 NNN
NN
NN
NN
NN
45 NNN
NN
NN
NN
NN
50 NNN
NN
NN
NN
NN
55 NNN
NN
NN
NN
NN
60 NNN
NN
NN
NN
NN
65 NNN
NN
NN
NN
NN
70 NNN
NN
NN
NN
NN
75 GGGCGTATGCGTGGGGGCGGCGGGGAGCGTGCAGGGGACAGGCAGGGGCGGGGCGTGGGGGCGTGGCGCGCGGGCGGCGG

5 GAGGTCGCCCCCGCCACGCCCTCCGGGTGAGGGTTGTCGTCGGGCTACGTCAGCCGCGGGAAATCCCTCCCGCCAGGCTGCT
CGCCTCTCGGCTGGGCCAGCACTCGGCTCTCCCGCTCCGCCCCCTGCGCTCCGCTACGGTGGACGGCGACGCTGGGTGAC
CCGGGGTGCAAGAAATTCAGGGGTGGGAAAGGTGTGAGCCGCAACCCAGCGGAGGGCGGGAAGAGGAGGAGGCTCTAGGGTGGT
CGGGGGACTGGGGGCCCCCGCGGAGAGGTCCCTCGGCTCCTGACTGACTGCTGCGGCCCTCCGGCCAGGACGCTGGGAGCT
10 GCCTGCGGGGAAGGTGCGGGAGCGGAGCCATGGCCTCCGGTGAAGTGTTCATGGGGCGGGGCTGGGCGGGGAAAGGAGCTCTT
CTGAAGGGGTCCTGCCCGAGTGAGTTTAGGGAGCTCAGTTTTGTGCGGGCGCGTCTGTCTTTAAATCTCATATGGTAAATTT
GTCAGCTTTTAAAAAAGTTACCTGCTTCAGGGTTTGGCTGCAGAAATCCAAGCCAGCTCTGTAATTCGATCCTGTTGTCATAGCAG
15 GAACCTTAGAAATCCCAACGACTTGATTTTAGGATTAGGGAGTCATAAGCGAACCAAGGAGGAGCGAAGAGTTCTCATTAAAAA
TGTATATGTATTGAAGATGGTGGTTTATGTTTTAGAACAGGAATGAGGAACCTTCAGACCTCGGGCAAGCTCTCTCCCCCTTTT
AGTTTAAATTTTCATCAATGCAAGAGGTGATCCCCCTTGACTGACAGTTGTACAAAATGTGTACGGCTTTAAAAATCATCCGTG
20 GTATTTTAAACAGAAATAGAAAATCCGTGGTATTTAAGTGTAAATGTTGCTTCGACCAAGTGTAGGCGGGCGGTGGCTCATG
CCTGTATTTCCAGCACTTTGGGAGGCCGAGGCGGGTGGATAACCAGAGGTGAGGAGTTTGAACAGCCTGGCAACATGGTGAAA
CCCCGTCTCTACTAAAAATACAAAATCAGCGGGGCGGTGGCGCGCGCTGTAATCCAGCTACTCGGGAAGCTGAGGACGAGG
AATCGCTTGAACCTGGGAGGTGAGGTGTCAGTGCAGATCGCGCCCTGCCTCCAGCTGGGCGACAGGAGGAGCCCTGAT
15 ATCTATTAAAAAATGAGTGTAGTTTTACTGTGAGATAAAGCTCAAGGTTCTTAATCTGACGAATAGAGAGCTTGAATCCC
CCTTCTCTCGCTGGAATAAGGGGAAAGAGGAGTTTGAAGATATCCGAGCTTTAAAAATAGTAGAGAAATGAAATACAACTTTA
TCACTTATGTGACTATATATTTCCCTTAATAAATGCTCGATCTCTCCCTTTGGGGGGAATAAGTTTGAAGAACATGTCAGAG
20 CACTTATGCTCTCTATATACAGATGTGTTGGGGTGGCTGAGCTTAAGGTTGAGGAGTGAAGAGTGAAGAGTGAAGAGTGAAGAGT
ATCCCCAACTGCTGCTGGTCCAGTGACCTCAGAAATGAGGCTGATGTTCTAGTAGAGATGAGGAAGTAGGAAGCTTAAAGAACCTTT
TAAAGGTTGAGCAGAACATGCCATAGCTATTGCTGTAGGCAGAAAAGGAAATGGGGTGTTCACATGACATTTGATTTGAGTT
25 TGTGTTGTTGTGAGAAATAAAGTGTAGTTTAAAAATTTCAACTTTCCCTTTTCCCACTTAAGTGACACAGAGCTTTGATGATA
ATCGTGTAATTTATGAATTCAGAGCATGTGTAGAGTGAAGTCTAAGATGACTTCAAAATATTTGTTAATGTTATGTTATCAG
AAAGATTTGTTTGAAGTAATGGAGATGCTAGCATTATAAGTAAGTTCAGGCTCTGGCGATTAAATCAAACTTTATTGATAT
ATTCGATGAATTTAATACCTTCAATTTTTCAGTTGAGAGAGGAAACACCACTTTCTATATAGAGTATTGTAGAGCCACAGGATT
30 TAAAAATTTGATACAAATTTAAATTTGTTTTCAGTGTGAGAGGAGGAGTATTTGTTGCTGTTGAGGAGGAAAGGATTCCCTTAAGGAGG
AAATGTTTAAAGAAATGGAAAGTTTAAAGGTTTGAAGTGAAGGTTGATTAACCTTTTTTTTTTTTTTTTTTGGTCTTTTCTAAG
AGTTGCAATTAATGGGACTATTTAAATGTAAACAGTATTAAATTTGAATTCAGTTGTTAGAAAAGTCCAGGCTGGAAATAA
35 AAAAAAATGTTTACAGGAATCTGTGACTTTTCCCTTAATCTGTTATAAGACCTTAGAGAAAGAAAGATTCACTAATAAA
ATCTTAAATCTTATTTGTTTGAACAGTAATTTAACCGGAAGAGTGACCAAAAAAAGAAATGCTTAGTTTTT
CATTTGCTAGTTTAGATTCTGTTGTTAGTAAAGTAGATTAAACCTCAGAAAGTAACCTTTATTATTACGAGATTAAAGAGC
40 ATTTCTTCTATTCTTACCAGATGTCATATGTAATAGGTATATGAGTTGAATATGTGATAGCTATAATGTAAGTAACATAAA
CATAATCTTAAAGCAAAATATGTAAGTTAGAAATGAGTTTAAATCATGTATATAATATGATTCTAAATTTTGTAGATAAGT
TAGCAGATTAAATAGGATTTCAGAGCTGTATTAAGCTGCTTTTCGTTGCTTTTTAAAAAATTACACCTTGATCAGCTCTTTG
35 ACATAATTAATATAGATATAGTGAAGAAAATGTTCCCAACCCATCTAAGGTATGCTAGTAGGCAGTTGTTGCTTTGTATAT
TATTTCTATTTAATATAAGTAAAATAGATATTTATGTTCTGATTTAAACCTTCTCATTTGTTCCAGTAAAAAGAGCAAAATGCT
TTGTTGGCAGATAGCTCTGTTAACTAATAATTAGTGTCTGCTTTGTTAAATGTTTTAAAAATTTAGATAATTTATTTTCTCAC
45 ATTTTCTTAGTATGTTCTTCTGTGTACACAAATAGGAAGGAGTACAGAAATGAATGTTTTGTAACCTCACTTCTTACCAA
CTATTGTTAGTGTGAATTTCAAGAGAAATGTTGTTTTCTCGATTAAAGGGAGAAATGGAAGTAAGTTGAGGCAACTTAATCTT
TAATAACAGAGCTGGAAGTTAGGAATGGATAGCTACAGTAAATGACTTTTTTTTAAGTAAATGCCACATGAGCATGAATGT
50 TTCAGAAATGCAACATGAAAAATAGAAAATCAATGAGTTAAATTAAGGTGACGTATGATAGGCACAGATAAGGGAAT
GAGTTAATGTAACTAGAGGAGGAGCCAGCAATGAATCATAATTAGGAACATCTAGGTTATGCTAGTATCTTCTCAATACAC
ATTTAAGGAGTACAGAAATTTTCTTTGTTCCAACTTTCTCTCATATGGGTTCTCTGAAAATGATTTGTTTGTAGGCACATGACCC
45 AAATATGCAATGGGATAAAATGTTTTCTGAAATTCATATTTATCTGGGCTCTCTGTTTTATTTTTAAACAGAGGTTGATT
GGTCTTGCAATTTGTTTTAACTTTAATACCTGTATAATCTAGGACAGCTTTTAAATTTATTTATTTTACCTGGCAGCTGCAAG
AGTTTTTCAAGACTTACCTTTTTCCCGCTTGGTAACAGAAATCCCTATTGCCAGAACTTTTACAGTTTTTACCTTGTAGTGCAT
55 AAATCAGTTGAATACCTCATCTGAAAAATTTCTTTCTTTGATTCTTAAGGCCAGTTGAAAGTCAGCTGATGATTGGAGTAATAA
AGTCAGCTGATATATGGCATAGCCTTTGGCTGATGAGAGACCTAGTTTGGGAAAAAATTAATAGATCTTATTTCTTTTCTC
CAAAATGAGTAGAGGTGATATTTGGAAAAATATATATTGTTAGCTCCATTGGCTCTTTAGGTTACAGGACAGGATGCTGACCGAG
50 GACCTTTATGAGAGACATGAGTCTAGTCACTATTCTCACTGTGGTGTGACACACTGGTGTGCAATCAATTGTTGTATGTTG
TGCAAGAGTTAAATATTTGTTGTAATTTTACTTTTTAAATAAATGAAGCATTGAAAGTTATCTATATTGTCATTTT
TTCTTGTGTTGTTGTAATAGGTTCTTTTTAAGTGGGAGATAAACACAAAGTTCAAGTTACAAGTAGCCAGAAATGCTTTGCTCA
65 ATTTACTCAGTCCCAGTCCATATTTGTACCTGAATTTTGAATTAATCTCTCAATATGTGCAATGTTGCTTCCACTTCATGTTT
TAAGACAATTTCTTAATCAGGAGTGTGTTAGAAATTTCTTGAAGGCTTTTTAGCAACGTGTATCTGGGCTTTAAAACTATGA
AGATTCTTTATCTTCTAAACATCTCAAGTGGGTAAGGACATGTATGTTTTGAAAAAATCACTAGGTTATCTGATGTACATCC
70 CCAGTATGAATCTGTTCTAGGAGTTTCTTTGGATCTAAATACTCATTGGCTATACCAGGATGCATTATCTTCTAAATTAAGTT
GCAATTTATTTAGATTGCAAGTTATGTGCTGTATCAGTTATACCTCCAGTTGCTTTTATGCTGTTTTTAAATTTGGCAGCTGCC
ATATTAGCATACCAATCATAATTCATTTTATTATAACTTCATATAATTTCAACTTTAGTTTATCATGTGTAAGATGGGATAAT
65 TTACAAATATTAGCTTTTTTTCTGTATACCTGTGCTGTTGCTAATCTAGCAATAAAGTGTGTTTAAATATGTTGTTATTTA
CGATAATTTATGATCCATTTAAACATTTCAATGTAATTTTTTATTTTAAAGCTCATGCTTTATTAGATAGGCATATGTTTTAA
AATAGCACTCTTTCTGCTAAGCGCAAAATAAAACATAGATATCTTACAAACATTTTGGCTGTATTTTGAAGTTATTTCTGAT
75 GTATATTAGCCTTTTAAATACTATTAGAAATATAGGGGTGAGTCCAGCTTTGCTATGATGTTGCTTAAAGAAAAATACAGTAATC
AATTTGTTTAGAGTCAATTTTGGAGAGCTTTTGGTCTTTTCAAACTGTGGCGATTGAGGTTATCTTAGTAAAGTACTTATT
70 TTTCCCTCAATTTCTGATTTATGTTTTTACCTCTTGACCTCCATAGATGACTACATTTCAACACATTTTATATTTAGGAAGATG
GCATTGTGCAAGCACAGTACTGAGGAAGGAGATAACTGGTGCAATGTACTGATGCAATATATAAATGATTTATAGCTGGGAAGTT
TTTTAAAAATCATAAACAGATAAATCAAAATAGGAATGAGTATGAGGAAATCTGAGGTGTAGCAATCCTGGTACCTATAAAGC
ACTATTTTTTTTCTTAGTAGTGAATCTAATTAATAAATCTGACTAATCACTTATATGATTTTAACTTTGAATAACTTTGA
75 TAAACAAAAGACCTTAAGATTTTTTAGTCATTCTCAATAGATGTTTAAATGAATATCTCTGACAAAGGCACTGATGAGTTAAACA
CAATTTCTGCTTCAAGTAGCTTGAAGAAATAAACAAGTAGCTTTATCTCAAGAAAGAAATAGACGGTAAGTTTCCCTAAATTA
CAGTTATTTGGAATAATGCTATACAGAAATCTAGTGTGTTTAAAGGAGGGAGATTTTCCAGCTGGGGGAATGTAGAGTA
TTACAGTATAGTGTGTTTACTTGGTTGTAATACTTACATCTCCCCAGCTTGTAAATTTTTTACCAATTAAGAGCTTCTGAGTAGGA
AAAAATAATCCAGGACTTTAAATACTCAATATATATGATAACTGATATTATGATGTTTTTACTATTTAAAAATATTAATCT
TTTCAACAACTACTTTTCTGTTCTTTTGAATAAATCTAAGAAAGTGTATGTAACCAATGAAGTTTGGGTTTTTTTGTGTTG

TTTTTGTGTTTTGTGTTTTTTTTTTTGTAGACGGAGTCTCACTCTGTCAACCAGGCTAGAGTGCAGTGGTACAATCTTGGCTCAC
TGCAGCCTCCACCTCCTGGGTTCAAGCAATCTCTTGCCTCAGTCTCCCAAGTAGCTGGGATTACAGGTGCCTGCCACCACATCCC
GCTAATTTTTGTGTAATTTTAGTAGAGATGGGGTTTCCACATGTTTTCCAGGCTGGTCTGGAACTCCTGACCTCAAGTGATCCACCC
5 ACTTTGGCCTCCCAAGTGTCTGGATTACAGGTATGAGCCACCATGCCCAGCCTCAGTGAATATTTGAATGCTCACTATGAACCT
AGCAGTTTTATTACACTCTCTCTTCCCAAAGTTAAACACTTTATCATTAACGATGTCAATTTATATCAGTTTTCCCAAGACACC
TTTAAATAGTAGTGGGCAGGGATTTATTGGCCTTTACTTCAGCCACATAAATATTTAAATGTGACTTAAAGTAATGTTGA
TTTTAACAGTTTTTAAAGAGAAATATACTTTCTTAAATACTCCTACAAGGATATATAAGGGTATGAAATATTTGAAATGCAATG
10 TGAATTTGAAATCTTTAAATATGCAAGGATAAAATCGTGAAATACTCATCTGCATATCTTATGTTTTTGTAGTAAACTGAAATAA
GGATTATGAACTTGTTTAGGTAAAGTCAGTTTTCTCTGGCTCTTCATCTTGAATAAACAATAGGTAGTAGATTCAACACAG
GGAGTTTACACCATAAGAAATTTGAAAGTTACAGTAATACTTTTATTCAGTAACCCAAAGTAGAAGCCATGGAATCATCAATG
15 ATTCCTTAAATTTCTGAGCTATCAGTGATTTCTTAAATTTCTTAAACCTACTGTTCCAGCACCAGGTGCTCAATTTTATCTTTT
AAATAATCCTTCATTCATCTTATCACTGCCATATATCAGAGATACCTCATCATTGCCACATTATTATAGTGGTCTCTAACTGA
TGACATTTGCTTTCTTTTCTATCTGTTCTGCTGTAATAAATTTACTCTTAAATGCAAACTCGATCATGTGATTGCTGCTGCAT
CAAAATATTCAATGATTTTATCAGATATAAATGAAATGAAATGCAATGCAAGTGTGCTGACTTTTGTGTTCTTTTAAAGAGAGA
20 AAGTGTGTTCCATTTACATTGGTGATTCTTAAATAAACCTCCTCTGTGGACACACTGTTCCCTTTTCCCTAGAATACCTACCTTT
TTCCTCTTCATTTCTCCGCTCTTTTGTCTTCATTAACCGCTCTTTTCCACTGACACAGTTGGGCATTCCTGACTCTTTCCGCTCT
ATTTCCGAGAAATTTGTAGTCTTCTTCTTCTGAGTCTTAATAATATATGTTGTTGCTTGTCTCTTATAAGGTCCTTT
AGAGTGACAGTTGGGATACCACCATAGTATCAATAATCATTGTTTTCAAGAAAGCATCTGAAATAATAGACACCATTTTTTTTA
TTTTTATTTTTTACACTTAAAGTTTAGGGTACATGTACACATCGTGCGGCTTTGTTACATATGTATACATGTGCCATGTTGTT
25 GTGCTGCACCCATTAACTGTGCTTTAACTTAGGTATATCTCTAATGCTTTCCCTCCCCCTTCCCCACCCACAAACAGGCC
TGGTGTGATGTTCCCTTCCGTGTGCTGTTCTCTGATCAATTCACCCATGAGTGAGAACATGCGGTGTTTGGTTTT
TTTGCTCCTCAGGATAGTTTCCAGCTTCATCTATGTCCTACAAGGACATGAGCTTATCTTTTTATGGCTGCATAGATTCCAT
GGGTATATGTGCCACATTTCTTAATCCAGTCTATCATTGTTGGACATTTGGGTGGTTCCAGTCTTTGCTATTGTGAAGAGTG
30 CCGCAATAAACACTTTGTGCACTGTCTTTATAGCAGATGATTTATAATCTTTTGGGTATATACCAGTAATGGGATGGCTGGG
TAAATAGGTATTTCTAGTCTAGATCCTCTGAGGAATGCCACACTGACTTCCACAATGGTTGAAGTACTAGCTTACAGTCCCACT
GTGTAAGAGTGTCTTCTTCTTCTCAGATCCTCTCCAGCACCTGTTGTTTCTGACTTTTTAATGATCGCCATTCTAAGTGGTGA
GATGATCTCATTTGTTGTTGTTGATTGCTTTCTCTGATGCGCAGTGATGAGCAATTTTTTACAGTGAGAACATTTATGAA
35 TGTGTATGTATATGACACTTCGTAAGAAATTTAGCACATATAATCTGTCTTCCACAACCCCAATGAGGTAGGTGCTATTAT
GATTATCTTATTTTACAGAGGAGAACTAAGAGATTTTAAATTTAATCATTCTTGGTCTTACTGTTAAGAAAGTAGCTGG
GGTAGGATCTTAAAGGCTCTTCTCCATCTGTTCTGATAAGGCCCACTGTGTTACCAATTTCTCAGGATGCTTGCCTCTCAACAG
40 GATAAGCCTTAGTCAGCACTAAAGTGATTAAAGGACACATTATTATTATTTTTTAAATGGAAACATCTTCCACCCCTATTAACTC
CCCTACTGCAAGTACAGTTGAGTGTCTATTACCTTTTCCCCCACAATTTGGATAATAAAGTAAAGTTGCATACATTTTAAATA
GCTTTATTGACATATAATTTATGACACAACTGACTTTTAAAGTATGCAATTTGACAAGTTTGAATATGTATACAACTCTG
45 GAATCATCATCACAAGATAATGTCCCCCTGCCCTTCTATCCACCATATATCCCTGTTCTTAGGCAACAGTGATCTGCTATCGT
TCATTGTATATTACTTTACATATCCTAGGGTTTCATATAAATGGAATCATACAGTATGTGCTCTTCTGGTCTAATCTTCTTCACTC
AGCATAATCATTGTGAGAGTCGTCATGTTATTATATGTAGCAGCTTCAATCTGCAGATGCATTTTGAATTTTGAATTTTAT
AGAAAGTGAATCTTTTTTCTCTATTATGTCTTTAGAAAGGTTTGCATGGGACTGATTGCACATTTCTGAGCCTTAAAGTCCC
50 TCCCTGGGGCTGTTTGTATATCTGTGTGAAGTCTTTAAATTTGAATGGAGATATAAAAACTTACATATGCTCTGCAAGGA
TTTAAATGCATTTTCAATTTTCACTGAAATGGTCTTTTCACTCAGTATTATGAATATGATGTAATAACAGCAGTTAAATATATTAA
45 TCACTTTTAGGAGTGTGATATTCTTCTGAATCTGCTTCTTACCCTTCTTGGGAACTTGGGGAACTTCTGCTAGG
TCTCAGTGGGAGGCAGATATCTCTGAAGTGGTATCTCAGAACTTCATATTGACGTTAGCTATAGATATTAAGCTATTAAGTGCT
AACCAGTCAATATGGTTTGAATGACTTGTGTTTGCATACATAGGGACTCAATTTGAATGGGAAAAAAGGTGCTCTCCAGCCA
55 ATCTCAAGATACATTTCCGCTCTGTTATTAAATGTTAGGAGGAAAAAATCTTTGTTTATGCTGCTGTTTATAAAAAACAGA
ATGTTAAAAATCCATTATTAATGCTATATTAATCTCACTGACCTCCTCTTTTAAAACTTTTCAAGGTGCGTATAACCGTATAT
45 AGAGATAATTTGAACAACCCAGGCAGAGGGGAATCGCTTTAGATACAAATGTGAAGGGGCATCAGCAGGCAGCATTTCCAGGGAGC
ACAGCACAGATAACAACCGAATACCTCTTATCCAGGTAAAGACCTTCTTCTGTGCTATCTCACTATTAGTGTGCTCATAT
ACTAGCTATAGCAATTTTAAAGGGCCAGTTCTTCAAGTCTATCTCCACAGGTTATCTTTTCTTTTCTTTTCTTTTCTTTT
50 AAACGGATCTGTCAAAAGACATCTATTAGATAGATGCTAAGGACATTTCTTAAATATAAATGGAGCTTCCCACTGCAAGATA
GTTCTATGGTGTGTTGTTAATTAACCTAAGTAGAGGCACTCAATGTTGAGAGTACACTGGCACTTTTGGATGCTGTTTCTTT
55 GGAAACACAGAGATAAATAAGGAAAAACCATCTCTGCAAGGTGAGTGATATTATCTGTAGATTAAACATGGATTGAGAACTCAA
TCATAATCTCTTCTGGCTAGTCTTAGGGCTAGAACAATTTTTTCTCTTTTCTTAACTTTATGCTGTCTCTGATTCTCTGGGT
CATTGACTGATTGAAATACCACTTTATAATACAGTTTTTACATTAGCATAAATTTTAAAGCTTTTGACCAAAATGACTT
60 TGGTAAACATCAATAGTTATAAGATGTAATAATTTATTATTATTATTATTATTATTATTATTATTATTATTATTATTATTATT
55 TGGAGTGCATGTCTGATCTCAGCTCACTGCAACCTCCGCTCCTGGGTCAAGTGATTCTCTGCTCAGCTACCGAGTAGCT
GGGATTACAGACGCCACCACAGCCAGCTGATTTTGTATTTTTTAGTAGAGACGGGTTTACCATGTTGGCCAGGCTGGTC
TCCAACCTCTTGACATCAGGTGATCCACCATCTCGGCTCCCAAGCGCTGGGATTATAGGCGTGAGCCACTGCTCCAGCCAAGA
65 TGTACTAAATTTATTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
TCTCAGCTCACTGCAAGCTCCACCTCCAGGTTCAGCAGTTCTCCGCTCTCAGCTCCGAGTAGCTGGGACTACAGGCGCCCC
TACCAGCCCACTAAATTTTGTATTTTATAGTAGACAGGGTTTACCATGTTAGCCAGGATGGTCTCAATCTCTGACCTCGTG
70 ATCCGCTGCTTGGTCTCCCAAGTGCTGAGATTATAGGTGTAGGCCAATGCTCCAGCCCAATGTACTAAATTTCTATTTCTA
TTTGTAACTATTTTCTTGTGATTTCAATGAAGGGTTATCTTTAAATGCCAATTTAAACTTTTAAAGGCAAGTAGATTGTA
AAAAGTGTGCTTTTGTGTTTTTGTGTTTTTGAAGAGTTTACTTTTATCAACAGATCTTAATTCAGTGTTTTAACTAGATTATTAC
75 AAAATCTATTCTGTGATGAACTTAAAGGGAATGCTGAATTATAGAATAAACCAATGGCAAAATTATATATTGAATCCAGAT
TTCTATTTTATCATTTTTGGCAGTAAATAGGATTTGGGTATCTAAGTCTTTTAAATGTTAAATGGATGAGATGCTAATAAA
65 AAGGAAATAAGGAAATACTATTGTCCAGTTTGTGAGTCAATTTTAACTTTTCTCAATAATCATCTTATCATGATCTCTA
TTTCTAAGATATGATTTTACCATTCCAGTAGGTCCTAAACACTTTACAGCTTGAATTTGTATTGCTTACTTATAGTCTTGAG
CAATTACCTCTCTTTATACAGAAAGAAATGTAATACTTCTGTTTACTTTCAAATTTCTATTAAATTTCAAATTTATGGATT
70 GTGCCCTCTACCTGTAAGCTACCACTTTCTACTTTACCTTGCTCTTGTGGTATGCTGGTTTTATAGTCCCTGCTTGTCTT
GCAACTTTTACAGCTTTCAAACCTAAGCAATTAATCTGCTCTCTCTCTCTCATGTTAAACTCTCTTTTACTCTGTGTTCTA
GCTATACTTTCTATGTGAAATTTGATGTTGTTAACTCAATTTGATTATGCTTATCTAGATAAACACTGGGGTATGCTTAC
75 TGAACAAATTTTTTGTGAAGTGAATGTATATTAAGTAAATGATCATATTTATGTGCTATCTTTCCAATACGGCTTAAAT
ATATTTTCAAGGAATGTTATGGTATGACAGTACGTTAAAGAGCTGGGCATTTAGTGACTTAACTATGTTTCTCTGTTCTATG
GATAAAATTTGGGTAGAGTTTACTTGTGTTTTGAAGGAAAAAAGCCAGTCAATGATATGACCAATTTGAATTTAGGGCAGAAAA
TATGTCAGGAACTGAGAGGTAAGTTTTCTGTACTGTTATCTCTGGAAGTTTCTATCTAACTGCAAGTTGTTGCTGAGCTGGAT
75 TTTATTTATCTAGTGCCAATTACATTATAATTAAGTAAATGAAATTTCTCATTATAGTAGATCAGTTTATAATGCAATCTATTGGA

TCATGTATTAAATTTCCCCCTTTTTCAGATTATGAACATTATGGAAGGAAAGTGAGAATTACATTAGTAACAAAGAATGAC
CCATATAAACCTCATCTCATGATTTAGTTGGAAAAGACTGCAGAGACGGCTACTATGAAGCAGAATTGGACAAGAACGCAGACC
TTTGTGTAAAGTACACAGTTACAGACATCTTCAGAAAATAAGATAAGACATAGGATGTTCTGTTTCTTCCATGACAATCTGTTT
TTTTAGCAGAATAATTTCTCATTCTACTTCTATTTACTGTATTTTACACTTACATTTTACTATTGCAATGAACTACCTTTT
5 CATTCTTTATTAGTAGACACATCTTATGATAGTTAGCAGGAAGACATTTTATTGTTATTAAAAGTAAACGTAAACTCTTGTATA
CTGTGATTTCTTTCTTGGGGTGGACAGTTTGTGAAATAATTATTCACCTCTGCTTTTTTTTTTTTTTTTTTTTGAGATGGAGT
TTTACCCTTGTGCTAGGCTAAAGTGAATGGCGCAATCTCGGCTCACTGCAACCTCCACCTCCTGGGTTCAAGCGATTCTTCTG
CCTCAGCCTCCCAGTAGCTGGGATTACAGGCATGCACCACCGCTGGCTAATTTTTTTGTTATTTTAGTAGAGATGGGGTTTC
TCCATGTTGGTCAAGCTGGTCTGGAATCCCAGACCTCAGGTGATCTGCCTGCCTCGGCTCCCAGGCTGGGATTACAGGTGTG
10 AGACACCGTGCCTAGCCTCTGCTTTTTCAATTATAGTTAACTTATTATTATTATTATTGAGACAAGGTCTCGCTCTGTTACCCA
GGCTGAGTGCAGTGGCATGATCTCGGCCCATTTGCAACCTTCACCTCCAGACTCAAGTGATCTTCAGCCTCAGCCTCTGAGTGC
TGGGACTGCAGGCATGTACCACCATGCCCGCTAATTTTTGTATTTTTTTGTAGAGATGGGGTTTTGCTTGTGCGGAGGGTGGTCT
TAGAATCTCGGACTCAGGCAGTCTGTCCACCTTGGCCTCCCAGAGTCTTGGGATTACAGGCGTGAGCTGCTGTGCCACGCCATT
TACAGTTAACTATAAAAATGCCTGGATGTGAGAAAATCAACTGGAATACTAGAGTTATTATTAGAAAAGTGGCAGGTATTAGAA
15 TTAACATACAACAATAGTTCTAAGATAAAAATAGTCATGTAATACTTCATGATAGTGAGGCTACCAGAAGATGGGCCATTATCA
GTTTGAAGTGAATAATAAAGACGTCTGGTAGGCAATTTAACTACATGGCAAAAGCCTGAAAATATTAAATGCTCTTGAGCCA
GCTGTTCCACTTCTAGGAGTTTACCTCAGAAAATAAATAGTGTCTGTTCAGACATTATGCTCTAATGCTGTCTTCTGAGTTT
TTGTAATGGCAAAAGCTAGAAGCAATCAAAATAGTAAGCAAGGGGATTAAATTAATAAAGTATACATTGCAATGTACTCC
20 TGTACAGCCTTAAAAATCATATTGCCAATATGTCTATTGGTATGTAATAATAGTCACAATATATTAGATAAATAGGTTTTCTGTTT
TTTGTTTTTTTTTCTTTTTGAGACAGTCTTGCTTTGTTGCCAGGCTGCAGTGAAGTGGTGTGATTTCCGCTCACTGCAACCTC
CACTCCCTGGTCAAGTGATTTCTCTGCCTCAGCCTCCCAGTTAGCTGATATTACAGGCATGTGCCACCATGCCAGCTAATTT
TTTGGTATTAAACCATTAGAGACAGGGTTTACCATTGTTGGCTGGGCTGGTCTCGAATTCCTGACCTCAGGTGATCCAGTGCCT
CAGCCTCCCAGTGTGGGATTACAAGCGTGAGCCACGGCACCTGGCCAGATAAATAGGTTTTAAAAACAATATGTAAAGAATAAT
25 TTTATTTTGTGTTTAAAGATAAATTTATACATATACATGATGTGTATATGTTAATACTAAGGTATTAATAGTAGTTGCTGGGTGGGT
AAGATTGTAGGGTTTTATGTTTTCTTTTAACTTATATTTTATAATTCATTTTTGTAATGAACATGTATTGGCTTTTGGGAAAAA
TGAACATAATGGCAACAGAAAGAGATTAATAGTCTCCACATATATTAGTAATAACATTTAGAAAAAATACTTTAAATGCTCCTC
TTACAATAATGAACAAAGAAAATATCTAGTATTATACACACTTGGCAATATTGTCTATATTACTTGACCTCCCAACCAACT
TTACACTGTGATCACTCCTTACTTGAACATTTTTATTCTTGTCTTCTGTGAAAACAACTTCCATTTTACTTCTGCTTTCTG
30 GCTGTTCTTCTTAGTTACAGGCAGTTAAATTTTTGGACACCTCACTTATTGCTTAATATGCTCTTTATGGCTGTTTCAACTC
TGTCCTCAATTCAGGATCCCATTAAGGATTACACACTATAGTTAAACATTATATTAACATGAATAACATGAATAATATTTCATGT
TAACATGAACATTTTGGCAAGAAATCTATAGAAGTGATGCAGTATAACTCTAAAAATATCCCTTCAGTTTTTTACATTATTGGC
GATATTATCTGGCACTTATATATAAAGAAAGCTTTCCCTTCTCTCTTCTCCATTTAAAAAGTATCACTGTAACACTCATGAT
35 CTTGTATTATAATATATTAGTTATTCTGTTATTCTTTGATTCTTCAAAATTGACCCAGATTGACTAATGCAAGCTCTTCAAA
TGCTCTCTGTGTTTTTTGATATGCCGTCATCTTTCTTTGAGCATTTTTTTACTTTCTGACAAAATGAATGTTCAAGACTTGTGC
TTTTCTTTTTCTTTTTTTTTCTTTTTTTTGGAGACAGGCTTGCTCTGTGCCCAGGCTGGAGTGCGGTGGTGCATCTCA
CCTCACTGCAACCTTCCCTCCCAAGTTCATGCAATTTTTGTGCTTGGCTCCCAAGTAGCTGGAATTACAGGCGTGCACTACCA
40 CACCCAGGTAAATTTGTATTTTAGTAGATACGGGGTTTCATCATGTGCCCAGGCTTGCTCAAACTCGTGACCTCAGGTGATC
CTCTGCTCAGCCTCCGAAATGCTGAGATTACAGGCATGAGCCACCGTGCCTGGCCAACTTGTGCTTGTCTGCCCCAGCCTG
AAGTCATCAGCTTTTCCAGAGATTCTTGGTCTCTTGGTGGGAATGGTAGTAAGTCTGATTGCCCTCTCAACATATTCCTTA
45 AATGCTCTAAAAGTACCTTAAGTAGCGGGGACAGTGGCCATGBCCTGTAGTTACAGCTACTCAGGAGGCCAAAGCAGGAGGATG
CTTGAGCCCAGGAGTTTGAAGTCCAGCCTGGGCAACAGAGCGAGATTGTATCTTTAAAAAAGCACTTCAAAATAG
AATATTCCCCAAACGTGATTTACTGTGATCATATCTTTCCCTCATAACTGGTCTTCTTCAATGTGCGGTATGTTAGTGATT
GCCATAAAGCACTATAGGTGTCTCTGACATTCCTCATCAGGTGTACACATTGAATCTACTAAGACTTACCTTCAAGCTGG
50 TTTTGAATCTATCCACTTCACTCAGTGAATTCATCACCGTCATACTACCACTATAGCTAACTGGGGCTGCTGGAATAACCTCC
TGACTGGTCTTGCAATTAACATTTTGTACCTTTTCAAAACCTCTATCTTCTCTGCTTTAGCCAGTGTGATCTTTTAAATACAA
ATGAATTTGCTTTTCCCTTGCTTAAACATTTTAAAGGTTTATTTGGCTTCTGGAATAAAGACAGACTTCTTATATAGCTTA
TAAGGCCACATGACCCACCTTTATTTCTAGCCTTCTATTAACCTCTGCTTTCTTAATTTTTTAACTCCACTCACAATGCCTTCC
65 TTTAGTTTCTCTGTTTCCACTGCTCTTTCTAGGGGTCTTTGTGTCCTGTTCTTTGCTGGAAGTGTCTTTCTCTGTTTCC
AGCATAGGCTCCCATACATCATGTATACCTCTTCAATAAATCTGTTATGATTGAGTTTATGATTGAGTTTGTGATGATTATTT
AATGTATATCCACTTGACAGAGACTACCGACTTTTTCTGTAAGACTAGATAGTAAATGTTTGGGGTTTTGCAAGCTGTATGG
TCTCTGTGCTCAGCTCTGCTGTTGTAGCATGAAAGCAGCCATAGATAATGTAAACATCAGTTTGGCTGTGTTCCAATAAACT
70 TTTATTTGCAAGACAGACAAGATGTTGGATTGGTCCATGAGTTACAGTTTGCAATCTTTCCACTAGACTGTAGCTTCTTGAGG
AAAGGATTGTATATCCCATTACTTTGTCAGAGTTTGTGTAATAGTAGACAAACCCAAAGCTTGTGTAATGCTGTAATGAAATG
AATGAATAATGATTCAACCAATCTTGTATCCTTCATTTGAGAAATTTCAAAATTAACCAACCCCTAATATTCCGTGAATAGCA
55 GTCAAATATGAGATTATTCAGATGAACAAATGAAGTAATATAAATGTATTAAATATGAAGAATCTATAAAATCTTTACCAAG
AAAAAGAATCAACCAAGAACTTTTCAAGAAGTGGAAATCTTTGAGGAAGAGGATTATAGTTGCAAGATTCAAGAAAGGATT
AAGAATCAAGATTAGCTGACCAAGCATAGTGGCTCATGCCATATAATCCAGCACTTTGGGAGGCTGAGGCAGGTGGACTGCTTG
AGTCCAGGAGCTTAAGACAGCCTGGGCAACCTGGTGAACCTCGGCTCTACAAAAATACAAAAATTAGCCAGGTAGGGTGTGATG
60 TACCTGTAGTCCAGCTACTCAGGAGGCTGAGGTGGGAGGATCACCCGAGCTGGGAGGCAAGGTTGCAGTGAGCGGTATGTTGTC
CACTGCATTCCAGCTGGGTGGCAGAGTGAGATCATCTCAAAAAAATGTTTTTAAAGATTATTTTGTAGTTATTGGAGGCAG
AGGAAGGAAATGTGAAGATATTTAGATGTAGCAAAATTTAGATGTGAAGAACATGAGCATAGACAGCATGAGTATGGAGAC
AGGCAGACAAAGTAGCTCCGGTTGCAAGTGCCATGTGAAGTTGAACAATAGTAATGTTATTATAATTGAGTTTGTCTTCTTAT
75 TCACGCCACCCCAATTTTACTGATGTATGTTTTCATGTGGGAACAAGTATGACTGGTGGTGGTGGGGAGTTECCCCACCA
TCGCTATGTCTACATATGCAAAATTAGTAGTATTGTAGCTATTGGGAAGTTTTTCATAAATGACATTTTGAAACTTGTAAATA
65 TTGTTAGCAATAAATCTTTCTAATACAAAAAATTTTAGTAATTTTTATGATGAATGGCTATAACTTTTATATAGTGGCAACA
AAACATTTCTACTGTCTAATAACAGTGAATTCAGGCTCAAAAGCAAAATCTCTGTGAGCTAGGCAAGCAGCATAAATGAGTGGT
GTGATCAAGTGTAGGAGGACTAACAGGCATGTAGCAAACTAAAGAGCCCTGAATAAATGGGGCTTAGTCCCTAGCCTGTTGTTT
CTGTGCCAACCTAGTATTGCCAGGTCTTTAAAAATGTACAAGAGAAGCCGAAATCCAGATGTTTATATGCAATTACCTGATTCTA
70 AATGTAGATACTGTGCAGATTTTAAAAATATAGGCAACACTTTTGTGAGCTAGCAAAACATACCTGCTTCAACCTGTG
AACATCTCTTACAGCTTTTGTCTTACATTATCAACAGACTTATTGATTGATTCTGAATTTGTTGGGAGGCAAAATTTACCA
TTAATATTGCTTTACTGTTAATCTATATTTGGTATGTTGACATAGGCATATTAGTAATGTAAAACTGTATGTTAAATGTA
TATAGTATATATTATTCTTTTAAACAGTTCTTGAAGTACAAACCCCACTTTTTTTTTTTTTTTTGGGAGAGTTTGTCTTTG
75 TTGCCAGGCTGGAGTGAATGGCGTATCTCGGCTTACCGCAACCTCTGCTCCAGGCTCAAGTATTCTCTGCTCAGCCTC
CCGAGTAGCTGAGATTACAAGCATGTGCCACTATGCTGGCTAATTTGTATTTTAGTAGAGACGGGGTTTCTCATGTTGATCA
GGCTGGTCTGGAATCTGACCTCAGGTGATCCACTGCTTGGCTCCCAAGTGTGGGATTACAGGCACAAGCCAGCGGCCA

587

588

[illegible]

5 CATGTTGACCAGGATGGTCTTGAACCTCTGACATCAGGTGATCCACCCACCTTGGCCTCCCAAAGTGCTGGGATTACAGGTGGGAG
CCACCACGCCCGCCAGTTTTTTTCAGATTTTAACTGATAATGTTATTTTTTCAAATGACATTTAATAATGAAAAAATTTATCCTAAC
AGTTAATTTTTCTGAGAGACCAAGACCTGGTCTCCTCGGTTCAATTTGGAGAGGAAGATACTTCAAAAAGGTATTTTATTTCTTA
TAGCATATTTCTGTGATCAGAAAGACAGTACTTTGCACAATATATTGGAATTTCTATTTTAGGAATGAATAAGTCTCTTTGA
10 AATTTTTCTCTCCAGATTTTTTCATGCTTTTCAGTATAGAATGAATTAAGCATGGCTTCTGAAGGTTGTGTAGAAAAGTATTATGTT
TTTGGGATTTATGTTTCAAGAAATACATGTTGTTTCATATGGTAGCAATTTTATTAATTACATTGCGTTATGAAAAAATGTTACTG
ATTTGGTTAGTTACCTGTTTTTATAAATAACATTTTACTGGAACACGGCCATGAATATTGATTAATATTCTCTAAACTGCTT
TTTTTTTTTAACTATGGCAACAGGGTTGAATAGTTCCACAGAGGCTGTATATAGCTCACAAGCCTAAAAATTTTACAATCTG
15 ACTTTTTACAGAAAAAAATGCCAATCCCTAGTTTAGGTAATTCACCCGAGGGCTAATTAGAAAGTCTTTTTTCCCCACGT
ACATTTCTAAATCATGCTTTTTCTGGTTTAGTTTGTAAAGCATTTGTATAATATGTAATAGATACAGAATTAATTTTTCTGT
AATTTTTTTCTGACTGTGAATTTTATAGTCTCTTAGGGTTCTGTGTGAATATATCTTAAAGTTATGTGTATTCTTATCCCTAA
TGAGTGTGTCTCCATCCTTCCATTTTCTCTAAAAGTGAAGAGTAAGAGATGATTTTGGCTATTGGAAATCCATTAATTTGTAAT
TCTAATATTATCTTTAGTTTTTCAAAAATACCTTTATAGAGCCTCAGAACTAGATTTTCATATTAATTGAAGTGAATTTACAT
20 ATGCCAAAGTAACCTGGCAAAATCATTTTACCTGTATTTGTAAATGGTATATACGTTACAGAATTTCAATTTTGGATTCTGTGAAT
AATTTTAGTGCTTTTTACATTTTTTATTTGAAATGTTACATTTGGTTTCTTGACATTTTCTTTATATATATTGTGTGCTTATG
CAATTTTTAATTAGAAATGCTTTTTATAATTTTGTTCATTTAATTTCTGTAATAAATTTTTCTCTCCACAGAACCAAACTGTT
TTCTCATGATGCAGTTGTGAGAGAAATGCTCAGGGGTTTCAAGTCAAGCAGAATCTTACTATCCCTCAGCTGGGCGGCTCTCAA
GTGGATTGTACATCATGCTCAATGGCACCTCTGCTTCTTCAAGCTGGTTCATCAGTGGCCACCCACCCACGCTCAGGCAAT
25 ACAAAACCCTAGTAGTTTTTCAACAAGGACACTTCTTCTAATTCGCAAGGTATCCACCATTCCTGAGAATACCTGTTGGGAA
TGATTTAAATGCTTCAATGCTTGCATTTACAACAATGCCGATGACATAGTCGAATGGAAGCTCATCGCATGCCATCAGAGATT
TATATGGTATTCTGATCCCAACATGCTGTCTAATGTTCTGTGAATATGATGACAACAGCAGTGACAGCAGTGGGAGAGATGAT
AATCCAAGACTTCTGAGCATGAATCTTGAAAACCCCTCATGTAATTCAGTGTAGACCAAGAGACTTGAGACAGCTCCATCAGAT
GTCCTCTTCCAGTATGTCAGCAGGCGCAATTTCAATACTACTGTTTTGTTTCACAATCAGATGCATTTGAGGGATCTGACTTCA
30 GTTGTGACATTAACAGCATGATAAATGAGTCGGGACCATCAAAACAGTACTAATCCAAACAGTATGTTTTGTTCAAGATAGTCAG
TATTCAGGTATTGGCAGTATGCAAAATGAGCAATTTAGTGAATCTTCTTCCATATGAATTTTTCAAGTATAACTTGAAGATTTAA
ATCCTTTTTAAATCTTGATACCACTATATAGATGACGATTTTGTATTTGCTAAGTGGGATATAATACTATATTATACTGTAT
ATATAATCTGACTGAGATATAATACTGTTTATGAGAAATATAAAAAATTTTTTCAAGGAAGAACATATATTTTGGACATAGC
GAATACAAAATTTGAAGCTGTCTATAAAAGCAAACTCAGAGGCCAGGCGCAGGGCTCACACCTGTATCTTAGCACTTTGGGAGG
CCAAGGCCGGTGGATCACTTGAGACCAGGAATTCAGACAGCCTGGCCACATGGTGAACCCCGTCTCTACTAAAAATACAAAA
35 ATTAGCTGAGCATGGTGGTACGTGCTGTACTGTGAGTCTTGGGAGGCTGAGGCACATAAATTTGTTTGAACCCAGGAAGCAGAG
GTTGAGTGAGCTGAGATCACACCACCGCACTCCAGCCTGGGTGACAGAGTGAGACTCTGTCTCAAAAAAATAAATAAATAA
CACACTTTTTTATATTTCTTTTTATAATGTTTAAATGTTTAAATTTCAAGCAAAATTAAGATAAACTTGTAATGGCTATGC
CAITGAAAAAATTAATTTTTTATTTTTGAGGCGGCAAGTAAACCCCTAAGGGGTTTTCTTAGGCTCTTGGAGCTTTAGAT
TTGTATGTATATCAAAATGCTTTTAAATGTTTAAATGTTTAAATGTTTAAATGTTTAAATGTTTAAATGTTTAAATGTTTAAAT
40 ATTTTATACTATTTCAATCTATGCTTTTAAAGTTGCTTATGATTTTAGCTGTACACTCATTTTAAAGGGAAGAAAGTTTCTTGG
ACCATTCCGCTTTCTTAGATGCTCCTCACTCCCTGTGATCTCATAAACTGCTTATTTGACATCTCTATCTAGAATCTAATTAAG
CTCACACTCAGCATATCCAAACTGAAATCTTGGTCTTCCCTCCAAACTGCTTCTCCTCAGTCTTCTTCCAACTCAGTAAATGG
CAATGCCATACTTCTGGTTGCTCAGGCCAAAAACCCCTGAAGTCACTCTGATTCTTCTTTAGCACCCATATCCAATCCATTAGCA
AATCTGGTAGACCTACCTTCAATATATCTAAGCTGACCACCTCTTTGACCTCTACTATTAACGCCCTATCCAAGCCACCA
45 TCATCTCTTCCCTGGATTGAAGCTGTCTATACAAAAATTTCTTATATCTTGCATTCCTACAGTCTTCCCATAAAGTAGC
CAGAATGATTATTTTAAACAGTCAACTCATACCATTCATCTGCTCAAAACCATTCATTGGCTTCTCATCTCACTCAGAGCAGT
CAAAGTCTCTTAAAGTTGCAAGGCTAGACTCCCTGTCTCACTCAGGTACCACCATATCCACCTCCTCATGCAGCTCCAGGACC
TTGGCTCAGTCTCTCAAGCATCAAGTATGCAATTTGCTTGGACAGTCTGACTTGGTATTCCCTCTGCCTTGAATTTGTTG
TCCAGAAAAATGCATAGTTCACTCTTACATCTTCAAGTGTCACTCCACTGTTACCTGAGCAGGTGCTCTGAAATATATACATC
50 AGCATTCCTTTTCCCTCTGCTTATGATGTCATAGCACTCACCAGCATCTGACTTTACTAAGTATTTATTCATTACTGTTG
TTTTCCCATACGAAATATAAACTTTCTAAGGACAGAAATTTTGTGCTTTATTTGTTGAATCTCCAAATTTGTAGAAAAATGCTCA
CTTATATTAACACTCAGTAAATGTTTATTTGAACATTTAAAGTATTACTAATAGAATTTGGTTTTTGAAGAAATAAATACTTTA
ATTATAAGACGTATATGATTTTTTGCAGTTTTACTTGTGACATTTGGGTTTATGAGAATCGTGTACATTCAGTCCAGGAATAAT
AATGGTCATCCAAATGTTTGAAGGTAATAAATAGAGGTTTCAATGAGAATCTCTAAATCCATGTTTGAACATTGCAAGCTCATTGCAAC
55 TTCCAGATTGAGTAACACTTATAACACATTTCTTTTCAAGTGCAAGATTTTAAAGAGACTTGTACATATTCAATTTGGCTGG
TTTCAATGGTGAGCTGAATGCTGGGTAATCTTACTAGCTCTTAAATCAGATTTAAATTTCTAGTGTTCCTAGTGTCTGCTG
ATACCTTTATGTAGTTGTTATAGCTGTAACTTACACTTTATTTGCTGTTTGTGTTTGTGACTTTTGGTAATCTGGCATTTAGA
AACCTTTCACTTTGCTTCAAAACGTAGTTATATTTGGAGTTTTTCAATTTGATATATAATTTATTTTGGCCCTTTATTTCCCAA
60 AGACATTGAAGGTTAATTAGATCATTTATTTTATTTACAGATTAAGTTGGGCAGTAATCTTAATTTATGATGGAATTTATCA
TTATGCTAAGTAATTAACCTTACCTAGTTTGTTTTCAACTAGAACCTGCCCTAAATGTTGAATATCTTCTAGCAAGAAACAGCT
TGTCATTTTACTTACAGATGTCTAACCAAAACATACTTACATAAACTAGTCGTTTGGTCAAATAGAAAAATGTTGTAATGCC
ATAAAAAAATAAATTTCTCAGTTAAATGATCTGGGAAATAGGGAAGACAGCAAGTGAGACTTGGGCTCAGGATGGTTTCAAGGA
AAAAAAGAAAGACCCCTGAGTACCATTAAATTTCTCAGAAATTAATTTTCAAAAGGAAATATTTCTGATTTATAAATTTTCT
65 ATGAGCAGCCATTATGAAATCTCACAAGAAATCATAGAATTAATAAAAAAGGTAGAAAGTAATTTTTTACTTAAAAATATAAAT
AAAAATAAATTTTTTAAATCATAGCACAATAAGAACTTACCAGGGAGAAAGAAAAACCTGAAGGCACAATTTCTTTTCTGTTCA
AAATGTGAACCCAGGATGCTCTAGATGATGATGGATGATAGGTGGGAGATTTTTTTTTTTTTTAAATACAGAATCTCATAGTTT
GGATTAATTAGCACCAATCAGTTTAAACACTGACTGTAGAAATAGCTGCATGGGTTTTTTCTTTAACTAATTAAGCGTTGGCTA
CTTAGTATAAGTAAGTATAAGCCGAATTAAGGTTCTGCTACATCTGTGTTTGAATATTTTTTAAATAAATAAGTGTGGCTA
70 GTTTTGGCGTGAAGCAGAAATTAAGGTTCTGCTACCTCTGTGTTTGAATATTTTCAATGGATTTTCAATTTTTCAGGTGCTATT
TTTGACCTGTATAGACTTTAATTTAAATGAATTTGTAACGTTTCTCCTCTGTCTCTACATATATTCTAGCTTTTCACTGCTCT
TTTAACACCTGCTTTAGTATCTGAGGCACTTTTCTGAACCTCTACTGTGCACTGGATCCCTCCTCTTCTCTGCCAGGCTGTG
TTTACTTTATCTTACATCACCCTAGTGATTCCTTTCTTGTATAACATGGTAAATGTTCTTATAGCTTAAAGGAAAGACC
AAATAAAACCTTTCTCACCCTTGGATGCAATTTGCACTCTGCTTCTGAAATGCTTCCAGCCTCCATTTCTTCTCCTCCAGTTAT
75 TCCTTAGCCAGCCATCTCTGTCTTTAGCTCCTACAATTTCTTAGGATATCTGCGAAAGATGAGCGGAGACTGCCCGCCTGTG
AAATCTAGTGTCTTTTTTCACTGCTTCACTGCTGACCTATGTATAACCTCCTATCTTCTCTTGCATCTCTCTGGGTT
TCTGTGTGATCAAGATTCCTCCTGAGATTTATTTCCATGAGTCTTGACCCCTCCCTCAGTGGTGCTATTTCCTCCCTACCC
GCCCTCCGATGATCTTATCAGAGCCACAGGTTCACTTTCTTTCATGCTACCTGAATGCTCTGATAACTGGCTCGCTCTCTTCT
TTACCTTCCATAATGGCATTACCATTTACCACGCCACCAAGATCTTACTAGGAACCTCAAAGTATTGTATTCTTTTCTCCATC
ACACTCATACTTAATCATCAAGTCTTTTGGAGTGTCTCTCTTGAATATGTCCTTCTTAATTTCTGCTGCTTCTTAGTAAAG

CGGAAGGTTGTAGCCCGCAAAACCCAGCGGAGGGCGGGAAGAAGGAGGAGGCTCTAGGGTGNTCGGGGGACTGGGGGCCCCGCCGC
AGAGTCCCTCGGCGCTCTCTACTGACTGACTGCGGCCGCTCCGGCCAGGAGCTGGGAGCTGCTGCGGGAAGGTGCGGGGAGCG
GAGCCATGCCCTCCGGTGCCTATAACCCGTATATAGATAATTGAACAACCCAGGCAGAGGGGAATGCGCTTTTAGATACAAATGT

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.